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## January 1952

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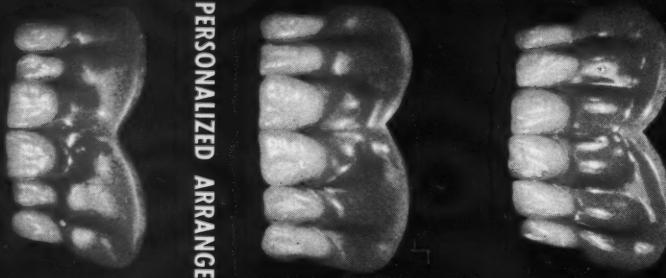
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# Dental Digest

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## IMPLANT DENTURE-

### ***A Simplified Upper Technique Using Immediate Prosthesis***

ISAIAH LEW, B.A., D.D.S., New York

#### **DIGEST**

*Since the publication in Dental Digest of the first reports on successful lower implant dentures in 1949 by Goldberg and Gershkoff<sup>1,2</sup> dental journals have introduced several variations and additional applications of the technique.*

*Weinberg<sup>3</sup> who discussed the subperiosteal implant of metallic abutments, Ogus<sup>4</sup> who reported his experiments with the upper implant, employing the direct impression method, Castigliano and Gross,<sup>5</sup> and Winters<sup>6</sup> are among those who have presented material on the subject. Histories of the metal implant, therefore, and the many ingenious applications and developments of previous research are not repeated in this article which is a detailed report of the author's initial experiment in inserting an upper implant. A two-stage operation, or direct impression technique, was used. The procedure was completely successful.*

*A step-by-step account of the procedure employed is given and the successive stages of the technique are illustrated. A postoperative view of the mouth six months after surgery is included. X-rays and photographs of the first patient reported to have a successful upper and lower implant inserted are presented.*

Author's Note: Gratitude is expressed to Mr. Eric Bausch, consulting technologist, Austenal Laboratories, Inc., and to Doctor I. Kestenbaum

#### **Comparative Value of Techniques**

In assaying the value of the various techniques and their applications, bearing in mind the quasi-experimental nature of the entire concept, several surgical shortcomings are found to accompany each application:

1. The one-stage implant method with the x-ray template and metal screws, described by Doctors Gold-

for invaluable assistance and suggestions in making this operation a success.

<sup>1</sup>Goldberg, Norman I., and Gershkoff, Aaron: The Lower Implant Denture, *DENTAL DIGEST* 55:490-494 (Nov.) 1949.

<sup>2</sup>Weinberg, Bernard D.: Further Report on the Full Lower Implant Denture, *DENTAL DIGEST* 56:478-483 (Nov.) 1950.

<sup>3</sup>Weinberg, Bernard D.: Subperiosteal Implantation of a Vitalium Artificial Abutment, *J.A.D.A.* 40:549-550 (May) 1950.

berg and Gershkoff, was less traumatic than other techniques but not as accurate in the hands of less skilled operators and therefore presented opportunities for postoperative difficulties.

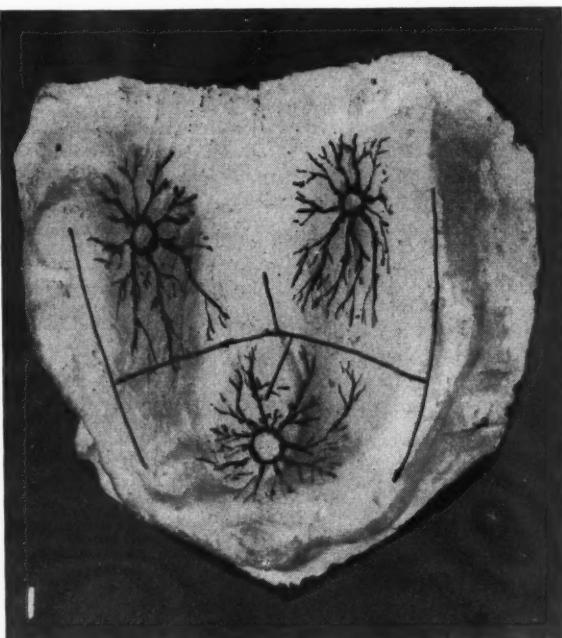
2. The two-stage operation is more accurate and requires less postoperative adjustment and manipulation.

3. All methods to date require multiple suturing (20 to 30 stitches) as the case may be, with a marked degree of edema, postoperative discomfort and opening of the wound, requiring a long time for proliferation

<sup>4</sup>Ogus, William I.: Research Report on Implantation of Metals, *DENTAL DIGEST* 57:58-63 (Feb.) 1951.

<sup>5</sup>Castigliano, S. G., and Gross, P. Phillip: Immediate Replacement Following Radical Surgical Removal of the Mandible, *J. Oral Surg.* 9:31-38 (Jan.) 1951.

<sup>6</sup>Winter, Leo; Lifton, Jacob C.; and McQuilain, Arthur S.: Replacement of the Body of the Mandible, *Am. J. Surg.* 69:318-324 (Sept.) 1945.



**1. Diagrammatic illustration of palatal blood supply and line of incision.**

of tissue and complete wound closures.

4. Four to six weeks of edentulous experience is always required which for many patients present psychologic, social, and economic hardships.

### Means of Securing

#### Retention

In reviewing his first attempts at full lower denture implants the author concluded that the greatest degree of retention of the implant structure is obtained from the mucoperiosteal proliferation through the implant mesh-work. The screws and boxes were important only to counteract the displacing force of edematous swelling of early postoperative inflammatory sequelae.

### Basic Implant Principles

1. On the valid theory that the smaller the space between osseous structure, implant structure, and surface tissue, the less is the need for healing by proliferation and granulation of second intention, and therefore the less edema and the greater rapidity of healing, it is apparent that a means must be devised for keeping tissue implant structure and underlying bone in close proximity to each other.

Experience with immediate denture surgery inspired the use of the immediate denture splint to effect the results outlined.

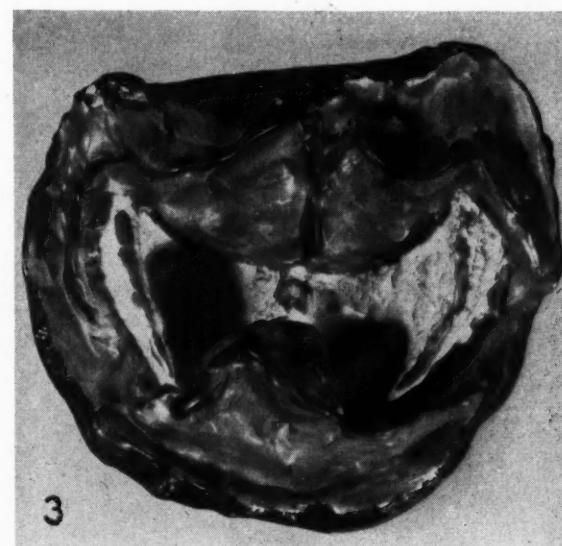
2. Because profuse bleeding contributes greatly to the separation of surface tissue from underlying structure, the judicious use of incisions in areas of terminal circulation (avoiding severance of larger arterioles or venules) would minimize accumulations of serous exudate and inflammatory operative experience.

3. Postoperative discomfort is always associated with multiple sutures, especially when edema is present. The strain of suture material on engorged tissue aggravates postoperative discomfort until the sutures are removed. Removal of sutures frequently results in the opening of the wound due to the relapsed elastic mucoperiosteal tissue released from tension and the pull of muscle attachments.

4. A minimum use of screws and



**2.** Note thin trabeculated bone of alveolar structure and dense triangle of maxillary suture.



**3.** Model of palate with tissue retracted. Note thickness of mucoperiosteum in retracted tissue.

their trauma on bone also contributes to diminished postoperative discomfort and hemorrhage.

*Modification of Initial Technique*—With the basic implant principles in mind the author attempted to modify the upper denture implant. The results were gratifying. In previous attempts at performing the upper implant procedure,<sup>4</sup> the surgeon em-

ployed the horseshoe shape, unsuccessfully resembling the lower implant as shown in Figure 10, placing the arch of the meshwork on the crest of the ridge from molar to molar.

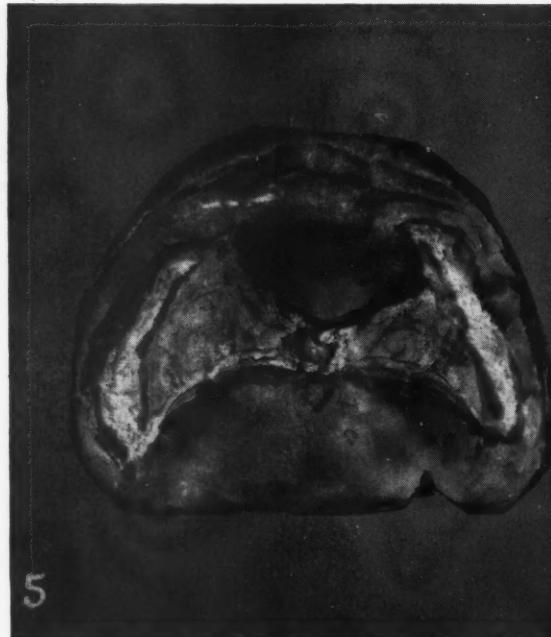
*Technical Hazards*—1. In studying the roentgenograms and skeletal subject of the maxilla, the following conditions are noted: (1) Most alveolar crests of edentulous maxillas show



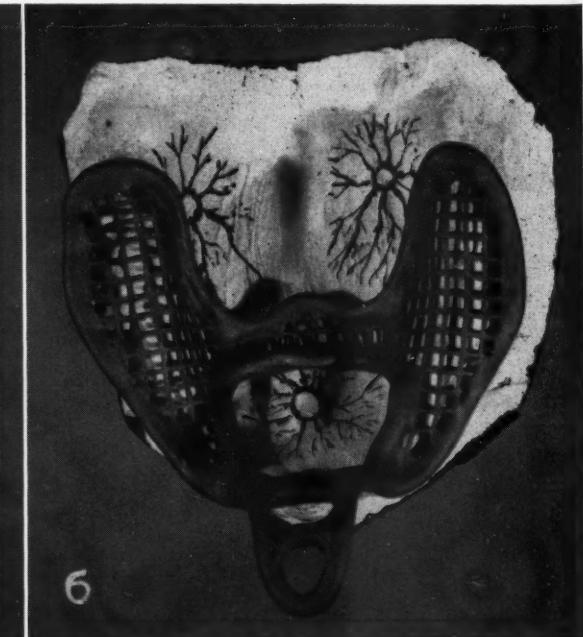
**4. Study models.**  
Note knife-like ridge in posterior area of mandible requiring alveolectomy.

**5. Model of denuded palatal bone showing extent of tissue retraction and mid-torus circular groove countersunk in torus.**

**6. Steel tray fabricated for impression.**



5

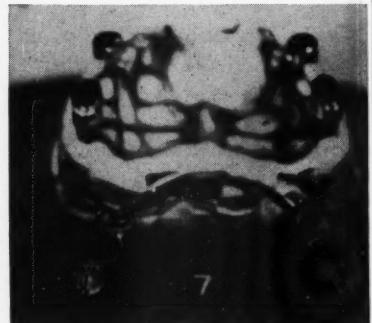


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spongy, fragile, and extremely treacherous osseous formation, usually only 1 or 2 millimeters over the sinus extensions; (2) the labial and buccal plates are likewise thin, spongy and devoid of compact bone; (3) the mucoperiosteal tissue, with the exception of the posterior alveolar area, is thin and weak, easily torn, and slow to heal.

All of these factors present definite obstacles for the fixation of the implant and the coaptation of tissue with successful proliferation through the implant mesh.

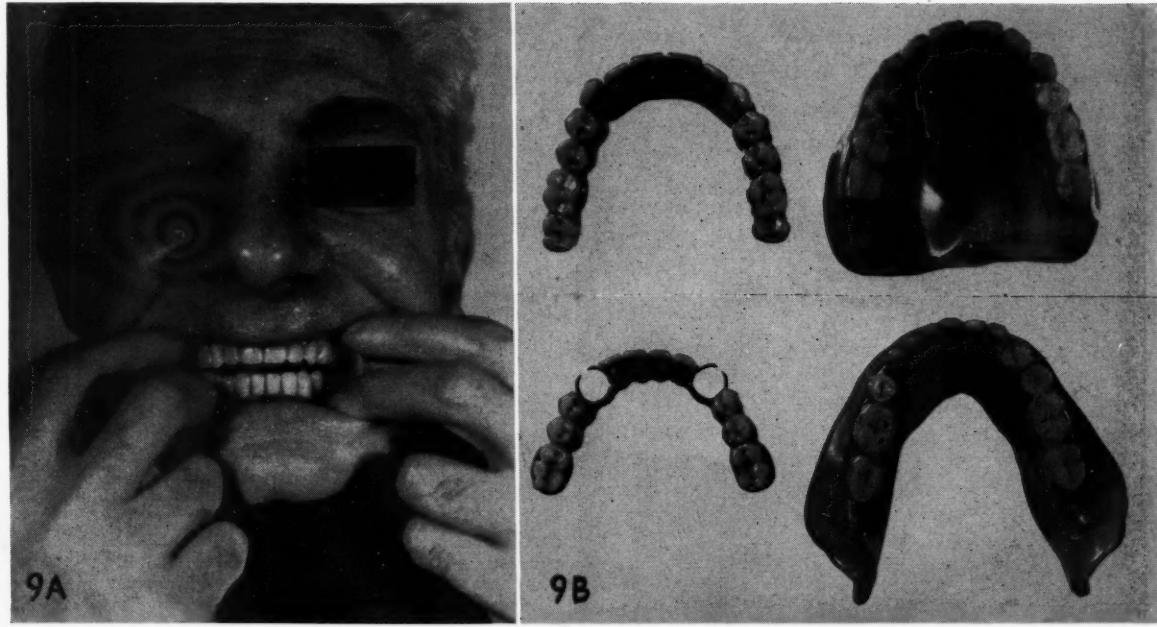
2. Another factor making this technique hazardous is the position of the anterior nasopalatine blood vessels, as



**7. Upper implant, framework, and superstructure.**



**8A.** Postoperative model. Ready for immediate denture. **8B.** View of immediate upper denture splint and lower platforms.



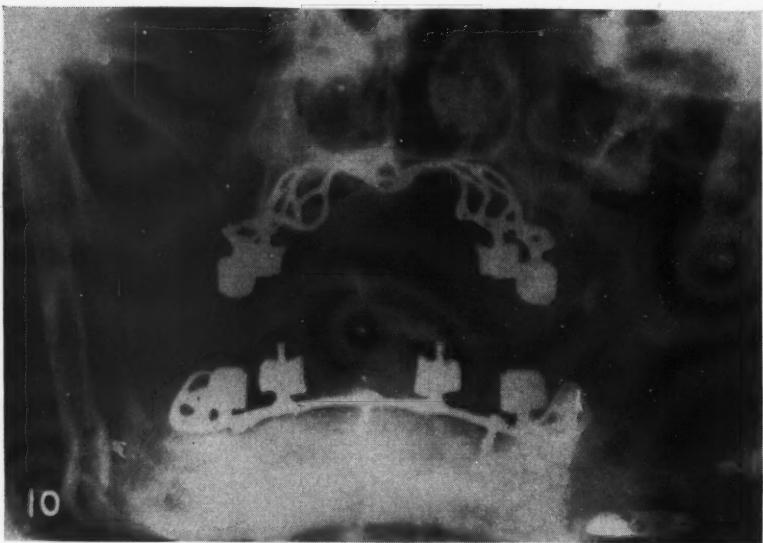
**9A.** Patient showing superstructure in mouth.

**9B.** Note absence of bulk in superstructure and comparison to conventional dentures.

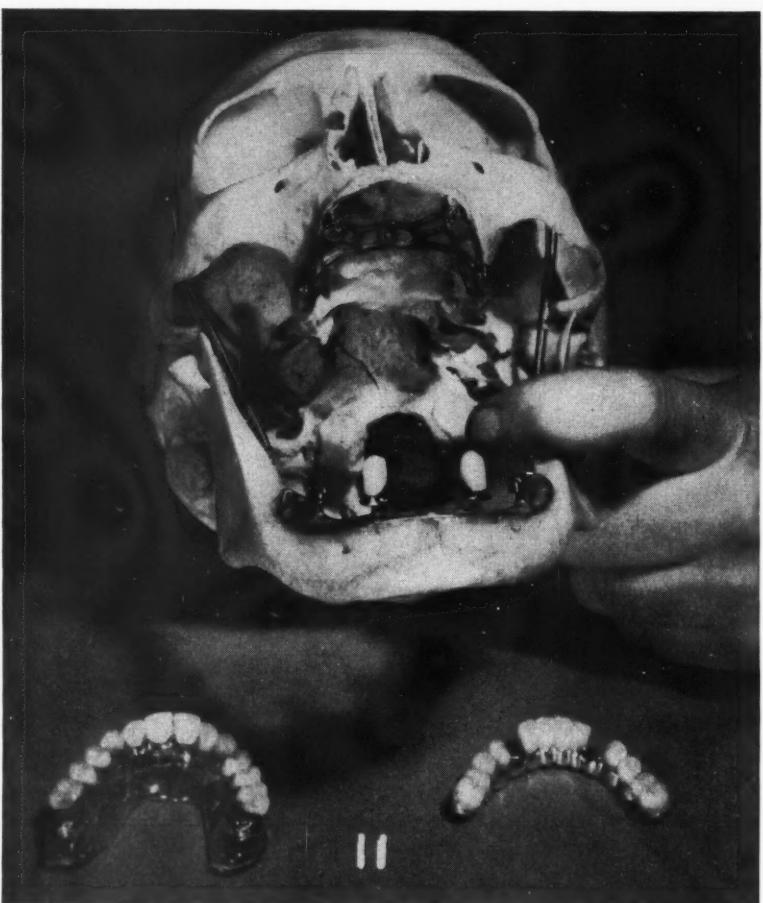
shown in Figure 1, which would be easily severed when lifting the incisal pad to insert the implant arch; creating profuse hemorrhage and edema,

and possibly lifting the implant away from the maxilla because of poor retentive quality of the screws in fragile osseous alveolar structure.

**Physiologic Factors**—Study of the anterior and posterior roentgenograms (Fig. 2) reveals (1) that the greatest thickness of mucoperiosteal



**10.** X-ray, six months after surgery. Note close adaptation to maxillary bone and good retention of screws.



**11.** Full upper and lower implant denture mounted on skull specimen, clearly recapitulating essentials of the implant technique.

tissues over the osseous structure in the maxilla is in the mid-palatal area from bicuspid to second molar across the vault to both sides of the maxilla; and (2) the only dense bone of any size in the maxilla is in the triangle bordered by the horizontal plates of the palate, forming the palatal suture and the vertical plate of bone or vomer. Any counterforces, therefore, to the displacing action of edema and physical stress by the screws of the implant would have to be in this triangular area.

**Direct Impression Technique Favored**—As the blood supply of the palate is composed mainly of the anterior and posterior palatal blood vessels (Fig. 1) minimal bleeding would be encountered if incisions were limited to the crest of the ridge in the second bicuspid area to the midpalatal line. It is common knowledge that the thickness in the palatal mucosa (Fig. 3) varies greatly in different mouths and in various areas of the same palate to such a degree that the template method of Doctors Goldberg and Gershkoff for determining the accurate contours of the osseous ridge appears less desirable than the two-stage operation or direct impression technique.

#### **Upper Implant Experiment**

Bearing in mind the various factors that have been described, the author performed an upper implant on a patient who, two weeks previously, had a lower implant denture inserted according to the original method of Goldberg and Gershkoff. Pleased with the results of the lower implant, the patient prevailed on the author to perform the upper implant operation.

**History**—This patient had been edentulous for several years and despite treatment by reputable prosthodontists, could not achieve minimal comfort from the routine prosthetic appliance.

In addition to anatomic obstacles some of the factors which prevented this patient's comfort were definitely psychologic in origin.

**Preliminary Measures**—(1) A thorough medical history was taken, (2) a physical examination was made,

and (3) preliminary impressions and study models were made (Fig. 4).

X-rays of the maxilla and the mandible, including occlusal plates and the anterior and posterior views of the head, were helpful in evaluating the anatomic landmarks for determining the limitations of the denture (Fig. 2).

**First Steps Routine**—1. The bite-blocks and try-in of the waxed denture were prepared as in routine denture procedure. Having a lower implant in position, the waxed arch on the lower superstructure was used for trying in normal denture teeth.

2. The patient presented a marked Class II relationship of the two arches; in order to allow greater latitude for a change in tooth position for the upper six anterior teeth, it would not be desirable to have the anterior abutments of the implant in the cuspid area. Rather, they should be in first bicuspid position.

3. With the try-in of the regular waxed upper denture, the position of the bicuspid and molar area was ascertained and marked on the model. A tray was designed in the shape of a wide palatal bar frame to facilitate the direct impression of the denuded palatal bone (Fig. 6).

### Procedure

Initial surgery was performed with mild preoperative sedation, employing infiltration and zygomatic block anesthesia. The following steps were taken:

1. An incision (Fig. 1) made on the crest of the ridge from cuspid to second molar, and from bicuspid to midpalatal area met a similar incision from the opposite side. The retracted mucoperiosteal tissue proved thick and dense (Fig. 3).

2. Single loose sutures were made on the posterior and anterior sections of tissue to facilitate retraction of tissue and impression.

3. A circular groove was counter-sunk in the midtorus osseous structure as a means of keeping the central part of the implant level with the rest of the torus (Fig. 5).

4. The impression was taken in soft green compound on a prefabricated tray (Fig. 6).

5. The tissue was cleansed and coapted with only three purse-string sutures.

6. The old denture was inserted and the patient was dismissed.

7. Postoperative conditions were excellent with relatively no pain, slight inflammatory symptoms and no general reaction. The patient continued with normal activities. The sutures were removed in three days.

8. A week later the implant and superstructure framework were constructed and the patient was ready for the second operation (Fig. 7).

### Second Operation

1. As in the first operation, the tissue was lifted away from the original incision lines. Almost complete absence of bleeding was noted at this time.

2. Metal screws were inserted without difficulty and tissues coapted as before with three purse-string sutures in three corners of the incision.

3. The incision area was covered with adhesive, an impression was taken (Fig. 8A) and an immediate appliance with a flat occlusal and six anteriors was constructed.

4. Rapid setting acrylic platforms were constructed for the lower abutments to close against the upper splint (Fig. 8B).

5. The patient was discharged with the splint appliance in the mouth and was instructed how to care for the mouth.

6. Postoperative experience was uneventful. There was no edema and no pain. The patient was comfortable and his appearance was improved. He continued his normal daily pursuits.

### Concluding Measures

1. After five days the sutures were removed. The incision lines were completely closed over. No implant or meshwork showed.

2. The following week, the superstructure was inserted on both the upper and lower dentures and the bite balanced (Figs. 9A and 9B).

3. Postoperative x-rays six months later show the patient enjoying normal masticatory experience for the first time since he became edentulous (Fig. 10).

### Summary

A simplified method of upper denture implant with new concepts original with the author is described. The technique incorporated the following desirable features:

1. Minimal bleeding, sutures, pain, discomfort, and edema.

2. No period of edentulous experience.

3. The use of a splint to facilitate healing and minimize discomfort.

4. The palatal area is left completely uncovered, allowing greater denture comfort and esthetics, more stability, and facilitating oral hygiene.

5. This technique permits the employment of the remaining anterior teeth against posterior fixed abutments, eliminating difficult free-end saddle removable dentures, and can be used prior to the extraction of six anterior teeth so that an immediate superstructure full denture can be constructed.

6. Greater latitude is permitted for variations of natural teeth used conjunctively with implant structures, anticipating future extraction of remaining teeth.

7. Hospitalization and prolonged absence from gainful employment are not required. For this reason the technique can be performed in any dental office where a moderate amount of surgery is practiced (Fig. 11).

36 Central Park South.

## AMALGAM - Class III

WALTER B. MARTIN, D.M.D., Seattle

### DIGEST

*The use of amalgam in the distal of the cuspid is a valuable procedure in operative dentistry. Amalgam is superior to the silicates or the plastics for restoring this surface properly, both as to contour and contact. When placed properly the material is not conspicuous and is the choice for those who do not prefer gold. A detailed procedure for the use of amalgam in this situation is given herein.*

### Cavity Preparation

The rubber dam is absolutely essential in cavity preparation. Moisture in the cavity prior to insertion of the

restoration material permits oxidation and a bluish hue to show through the enamel.

### Description of the Restoration

1. The outline form assumes a typical extension for prevention and is prepared with a lingual dovetail large enough to give bulk of material for strength.

2. The little seen from the labial conforms with the outline form of the curvature of the approximating tooth.

3. The dovetail is broad, occupying the middle third of the lingual surface and having a mesial extension into the large middle lobe.

4. The dovetail parts are curved and the mesial wall of the dovetail parallels the long axis of the tooth.

5. The gingival extension is under the free margin of the gum.

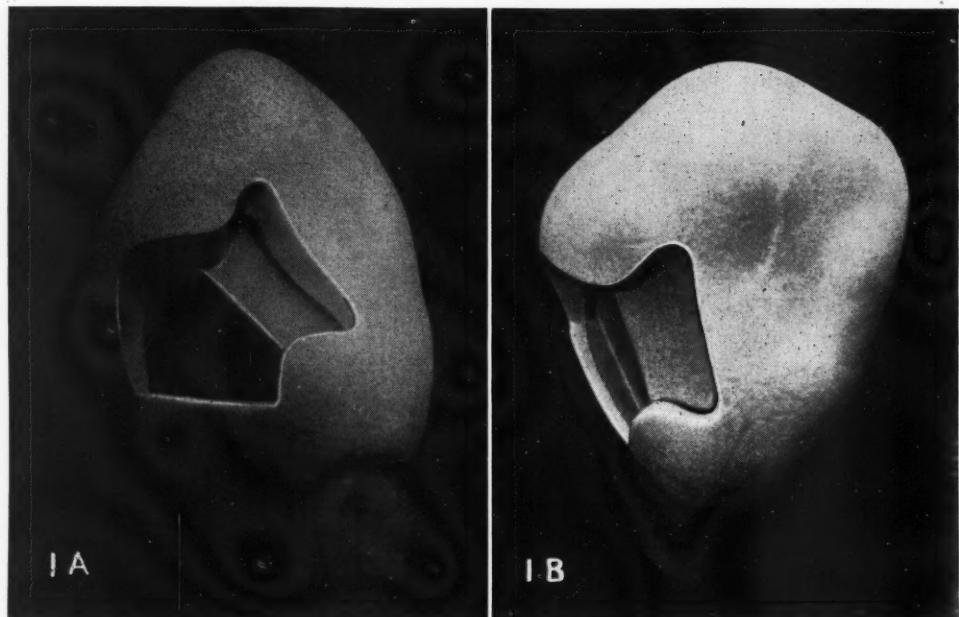
**Retention Form**—The box preparation on the proximal, joined with the dovetail on the lingual guarantees the retention form. Internal line angles are definite and slightly acute, and the proximal point angles are sharp. The axiopulpal angle is slightly rounded.

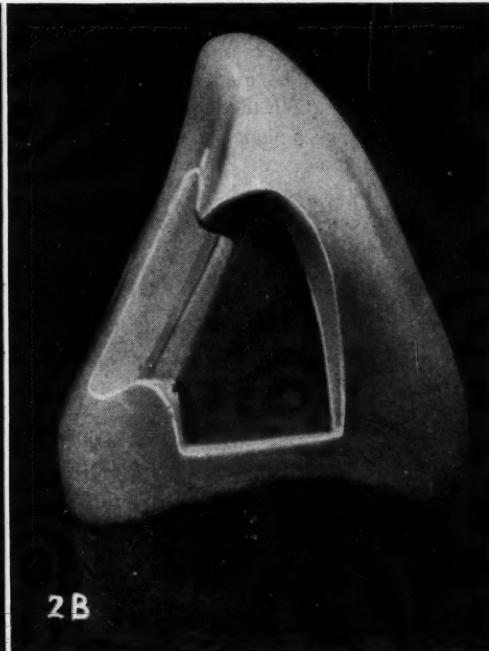
**Resistance Form**—In most cases resistance form in the distal of the cuspid is a minor problem as there is relatively little stress of occlusion in this area.

### Lower Cuspid Preparation

When the distal marginal ridge is

**IA. and 1B.**  
*Typical upper cuspid preparation showing proximal box and retentive lingual dovetail.*





**2A. and 2B.**  
*Dovetail preparation on lower cuspid when lingual wall has been undermined by caries.*



**3A. and 3B.**  
*Lingual wall left standing on lower cuspid preparation for incipient caries or initial caries. Labial wall follows the curvature of approximating first bicuspid.*

undermined by caries the lower cuspid preparation may be made in a similar manner. The labial outline conforms with the curvature of the approximating first bicuspid. In initial caries, with little penetration under the lingual marginal ridge, the choice would be a typical Class III foil preparation with rounded and more retentive angles than for foil. Because of the immunity of the lingual sur-

face the lingual wall is left standing.

#### **Use of a Germicidal Agent**

1. Silver nitrate is not used in the cuspid for esthetic reasons.
2. Thymol is excellent as a germicide and may be applied to the cavity (1) as melted crystals, or (2) in solution, such as Hartman's solution. The latter is easily handled as the volatile elements disappear rapidly, leaving a thin coating of protecting thymol over the dentine.
3. The margins are planed lightly to remove the thymol, and the labial margin may be finished with a fine cuttle disc. Care should be taken not to leave a fine bevel where a thin margin of amalgam may develop.
4. The rubber dam is essential when using Hartman's solution as the agent diffuses rapidly and creates an

intense burning sensation on the gingival tissue.

### **Instruments**

1. A Mizzy matrix holder is acceptable (1) because it permits a satisfactory gingival wedge, and (2) is contoured to facilitate proper con-

tact with the proximating bicuspid.

2. A contoured .002-steel band may be used, reinforced with compound on the labial and lingual and wedged gingivally with a piece of soft wood.

3. The amalgam is condensed with a mechanical condenser. Excess is removed and the matrix band is with-

drawn in a labial direction.

4. The proximal margins are trimmed with a Number 7 Black knife, the others with a cleoid. The restoration is polished at a later sitting.

1302 Medical and Dental Building.

## **Blindness After a Mandibular Injection**

### **Question**

A peculiar situation developed in the dental office after a mandibular injection for an extraction. A woman presented for treatment. The lower left molar had to be extracted. A mandibular injection was made in the corresponding side (using mono-caine), with a ten-minute wait for the anesthetic to take effect.

Surprisingly, instead of taking immediate effect on the lower jaw, a light ring began to form around the patient's left eye; at the same time the patient stated that the vision was beginning to fade on the same side. Two minutes later she could see absolutely nothing.

Very, very slowly she started to regain her sight. The extraction was finally made with completely satisfactory results. The dentist's comment in this case was that the condition was an anastomosis.

### **Answer**

A number of similar complications have been reported. The phenomenon was submitted to Doctor C. August De Vere, a teacher of anatomy, who is experienced in dissections of the head and neck. Doctor De Vere's explanation seemed plausible and is repeated as follows:

"The experience encountered in this case may be explained anatomically by a reflex manifestation ex-

pressed through the ciliary ganglion and the long and short ciliary nerves.

"This ganglion is located in the posterior part of the orbit, between the optic nerve and lateral rectus muscle. At its posterior border the ganglion receives three roots:

1. A long sensory root given off by the nasociliary, a branch of the ophthalmic division of the trigeminal nerve.

2. A short or motor root which springs from the oculomotor nerve.

3. A sympathetic root which is derived from the lateral carotid plexus."

*Physiology*—"From the anterior border of the ganglion, the short ciliary nerves are given off. They pass along the optic nerve and at the back of the eyeball (from twelve to eighteen may be counted) where they pierce the sclera around the entrance of the optic nerve.

"The short ciliary nerves contain motor, sensory, and sympathetic impulses to the sphincter and dilator pupillae of the ciliary muscle of the iris.

"The long ciliary nerves spring from the nasociliary nerves, a branch of the ophthalmic division of the trigeminal. They are sensory nerves and send twigs to the ciliary muscle, the iris, and the cornea."

*Anatomic Anomalies*—"The patient in question may have had abnormally low tegumen; that is, the

floor of the middle cranial fossa and the trigeminal ganglion resting within it, may have curved lower into the infratemporal fossa. Or a very short-necked condyloid process, or a mandibular foramen placed higher than normal, any of these osteologic anomalies would result in deposition of the anesthetic solution relatively closer to the trigeminal ganglion.

"Absorption of the solution into the ganglion would express reflex action in other divisions of the trigeminal nerve in this case, the ophthalmic and its own terminal branch, the nasociliary; as well as the ciliary ganglion in direct communication with the ophthalmic divisions."

### **Comment**

The unpleasant occurrences cannot be avoided if the anatomic anomalies described by Doctor De Vere exist; but efforts to prevent or minimize them can be made by injecting the anesthetic solution at the proper height.

It is understandable that the higher the injection the more likelihood there would be for the solution to diffuse into the ophthalmic nerve and through it to the ciliary ganglion and the optic nerve. Fortunately, this is of a temporary nature and vision will be restored to its normal condition.

Adapted from *Modern Dentistry*  
18:26-28 (October) 1951.

## **We Can't Pay You, But—**

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## The OCCLUSAL CURVE

HARRY L. PAGE, Valparaiso, Indiana

### DIGEST

*It has been commonly believed that voluntary, artificially induced lateral jaw movements would create a proper occlusal curve. This is not consistent with the involuntary and natural jaw movements that result in tooth contact and final closure. There is evidence that the occlusal curve originates in a combination of hinge-axes controls and the mandibular angle. This paper presents the evidence. The occlusal curve is defined and distinguished from the curve of Spee and the occlusal plane.*

### Mechanism of Chewing

There is a universally accepted concept that occlusal curves are generated by, and conform to, paths followed by condyles gliding over their respective fossal slopes during lateral jaw movements. This might be true if the human being chewed by wagging his jaw like a dog's tail. However, he does no such thing. He drops his jaw open until the teeth are widely separated, shifts to one side or the other to grasp his food, and then lifts and swings his lower jaw bodily at an angle terminating in masticating closure.

*Closure Movement*—With his mouth empty he does essentially the same thing although he tends to forego much of the shift to one side. During this closure movement the body of the mandible follows a course that is predominantly vertical but does incorporate a small amount of sideward movement. Where teeth are well articulated, the resultant angle of approach

taken by the mandible in closing against the maxilla will direct the buccal cusps of the lower teeth on a course nearly parallel to, but just clearing, buccal cusp inclines, transverse ridges, and sulci of opposing upper teeth. There is no contact, either "working" or "balancing," until ultimate closure occurs.

*Lateral Movements in Contrast*—A situation in complete contrast is presented by lateral movements: 1. The jaws are held closed against (1) bite rims, (2) center-bearing pins, (3) wax and tooth combinations, or (4) upper and lower teeth. 2. As the lower moves in lateral, there is no vertical movement of the mandible body as a unit. It rocks in combined radial and medial motions like a saucer sliding in and out of another saucer. Again, this would be perfect if the patient chewed this way.

*Source of Final Closure Producing Contact*—In chewing there is no tooth contact until both condyles are in their fulcral positions in the fossae. Here, all lateral movement except the Bennett has ceased. Therefore, all curves resulting from artificial laterals have been generated by movements occurring before teeth reached initial contact. The final closure that produces contact stems from the hinge-axes and the Bennett movement.

*Product of Radii*—This being so, the occlusal curve must be a product of radii from the hinge-axis to each tooth, modified by the mandibular angle. The longer the radius, the shallower the curve. The more acute the mandibular angle, the sharper the curve. The overall, composite curve

may be similar to one generated by artificial laterals but will not coincide with it.

### Definition

Many dental terms are used carelessly and have different, even contradictory, meanings for different dentists. Hence, it will be well to clarify the term, "occlusal curve": *The occlusal curve is a composite of apposed occlusal surface curvatures in the sagittal, frontal, and horizontal planes.*

*Differentiation*—1. The occlusal curve is not the same as the curve of Spee. According to general authority and the Dictionary of Dental Science and Art, the curve of Spee is "the line beginning at the tip of the lower cuspid and following the buccal cusps of the bicuspids and molars, continuing to the anterior border of the head of the condyle."

It is understood to be a uniform curve. By contrast, the occlusal curve stops at the distal cusp of the distal lower tooth and is not uniform, being steeper at the posterior in all planes but the horizontal in which it is shallower.

2. The occlusal curve is not the arc of closure. The latter is the arc along which any given tooth approaches its opponent in the sagittal plane. XY, VW, and NO in Figures 1 and 2 are arcs of closure.

3. The occlusal curve is not the occlusal plane. Again accepting general authority and the Dictionary of Dental Science and Art, the occlusal plane is defined as "the plane established by the occluding surfaces of bicuspids and molars of both jaws in opposition; see curve of Spee."

*Terms Misleading*—The latter def-

ition is confusing, contradictory, and incorrect: A plane is neither (1) a line, nor (2) a collection of divergent surfaces such as the combined cusps, sulci, transverse ridges, cuspal inclines, and fossae whether in "opposition" or apposition.

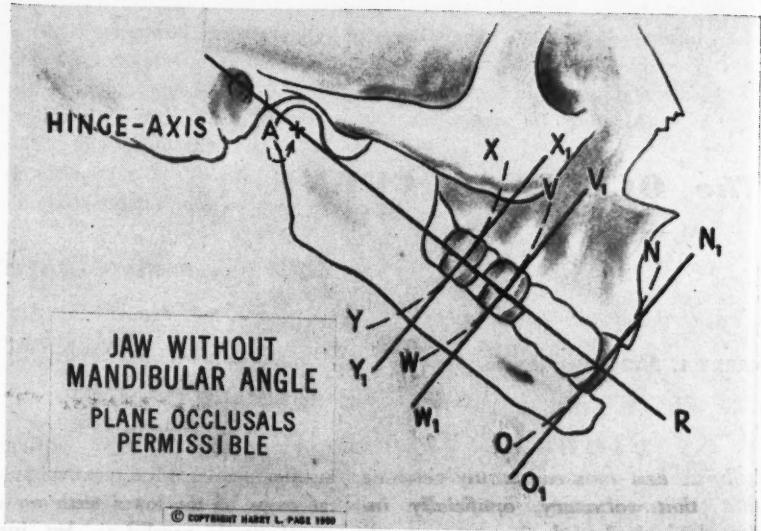
*Explanation of a Plane*—A plane is a single surface containing no elevations, depressions, or curves of any kind. Hence, an occlusal plane must be a trapezium with its corners based on the distal cusps of the distal lower teeth and the tips of the cuspids. Its anteriorposterior sides constitute chords subtending the occlusal curves on respective sides of the jaw.

*Curved Plane an Impossibility*—Dental literature teems with discussions on the relative merits of the "curved plane of occlusion" and the "flat plane of occlusion." Obviously, there can be no such thing as a "curved plane of occlusion." In Figure 1 is shown the only type of jaw that will permit the use of plane occlusion, this being the correct term for the pleonastic "flat plane of occlusion."

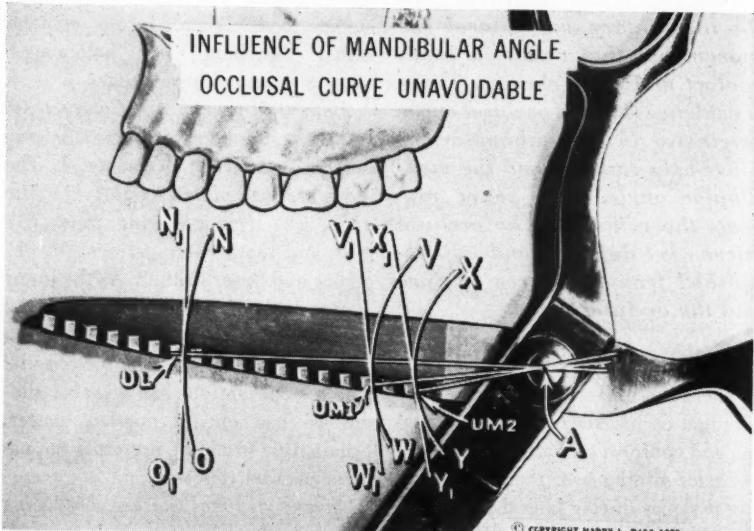
### Hypothetical Problem

Referring to Figure 1, imagine the ramus and mandible to be a straight line from the condylar hinge-axis, A, to the incisal edge of the anterior teeth. The space of the cuspids and bicuspids is left blank since the point will be quite clear without including those teeth. For the same reason, all teeth are represented as having plane occlusal surfaces. Imagine further, that as in some animals, the mandible is capable of simple opening and closing movements only.

*Arches of Closure*—As the mandible opens and closes on the hinge-axis, it is clear that the teeth will travel along the arches, XY, VW, and NO. Were there other teeth present, each would likewise, have an individual travel arc. Since all these arcs have a common center at the hinge-axis, they are concentric. With the jaw open, a radius drawn from the hinge-axis along the occlusal surface of any tooth on the mandible will also pass along the occlusal surface of every other mandibular tooth.



1



2

### Requisites for Plane Occlusion

The radius described will pass along the occlusal surface of every maxillary tooth as well, with the jaws closed. This is shown in Figure 1 by the radius, AR. If tangents, such as  $X_1Y_1$ ,  $V_1W_1$ , and  $N_1O_1$  be drawn perpendicular to the radii at the occlusal contacts, all will be parallel. Under these circumstances a plane occlusion and plane occlusal surfaces will produce simultaneous and satisfactory contact with a similar apposing plane and plane occlusal surfaces. But this does not happen to be the structure of the human jaw.

### Evolution of the Mandible

A few million years before man began to display signs of objective reasoning necessity devised an offset for the jaw; for efficiency and esthetics the mandibular angle was created. The device has been copied and is today common in all kinds of machines. However, this offset made a different arrangement of the occlusal surfaces necessary. An examination of Figure 2 shows why this is so.

*Figure Two—Description*—1. The lower part of Figure 2 shows the tooth and tooth-way arrangement of a pair of pinking shears. 2. The hinge-axis

of the shears is represented at A. 3. Radii have been run from the hinge-axis to the tooth-ways that correspond roughly to the two posterior and one anterior teeth in the head. 4. Arcs have been scribed and tangents have been drawn as was done in Figure 1. But the resultant lines are quite different. Also, the fact that the shear teeth are set in a curve is apparent.

*Tangents not Parallel*—1. The action of the pinking shears takes place through an offset similar to the mandibular angle of the human jaw. 2. The closure arcs along which the teeth move through the tooth-ways are concentric like their counterparts in Figure 1; but the tangents to those arcs at the occlusal contacts are *not parallel* as are the tangents in Figure 1. 3. Furthermore, a radius drawn from the hinge-axis to the occlusal surface of any tooth will *not*, when continued, pass along the occlusal surface of every other tooth. This applies whether the teeth be opened or closed. 4. Finally, the tangents incline toward some vague convergence above the shear blades.

*Alinement of Tangents*—All these situations exist because of the offset that is comparable to the mandibular angle. Since these tangents display an alinement characteristic of the spokes of a wheel, it is manifest that any perimeter joining them with right lines must result in a curve. This corresponds to the occlusal curve obvious in the maxillary comparison at the top of the drawing.

#### **Monson Theory Refuted**

The discussion in this article must not be construed as an endorsement of the Monson spherical theory. It is, in fact, quite the opposite and proves to be a complete negation of that theory. This will be clear from the fact that the inclinations of the tangents are not uniform. As a result they cannot converge accurately upon any one point but must intersect at widely divergent points in some indeterminate region. However, unless all such tangents do intersect at a common *center point*, there can be no uniform sphere such as the Monson theory postulates. For the same rea-

son, the assumption that the curve of Spee is uniform stands controverted.

#### **Conclusion**

Evidence has been presented that the occlusal curve is formed by the combined influences of the hinge-axes and the mandibular angle rather than by the condyle paths. This connotes a drastic change in articulation concepts and procedures. Natural vertical jaw motions must supersede artificial laterals as primary movements in articulation. Laterals, including the Bennett movement, must assume a secondary role as satellites. Cusps must be steeper rather than flatter and flat teeth appear to be doomed. Instead of considering articulation as "planned interferences," with "working" and "balancing" contacts, there will be no contacts at all until ultimate closure occurs. This theory has already been tested in actual practice. Comparative initial results have been highly gratifying.

104 Garfield Avenue.

### **Coronary Disease in the Community**

Although predominantly a disease of males, particularly in the younger groups, an even more marked characteristic is that it is a disease of the professional classes. The highest mortality is among physicians and surgeons. In considering the etiologic possibilities examination must be made of conditions of work and the strains in many professional and business careers which, if endured too long, might become beyond physiologic tolerance.

Some have argued that under-exertion of the body may be a more important etiologic factor than over-exertion of the mind. It might be added that overwork is more often a symptom of overstrain than a cause;

and the emotional factor emerges again as one of the features of the disease. As Thomas Hardy wrote, more life trickles out through a man's thoughts than through a gaping wound.

Coronary disease appears to result from a pathologic adaptation to stress. Although the problem can be stated in terms of "disturbance of mind" and of ischemic heart muscle, its solution, like that of other stress diseases, can also be sought in a more philosophic concept, such as the description of a sickness of the community "in which the multifarious contacts of recent times grow to a point at which the human being cannot adapt himself without spiritual

and mental and often bodily sickness."

In elaborating this idea the point was made that the ambitious person who strives to achieve independence is at the present time subject to a new form of stress for which recent social changes are responsible.

The social historian of the future will perhaps write about the present rise and recognition of the stress diseases. In at least one of them he may well wonder why doctors, whose profession was to teach patients how to adapt to their circumstances of life, were themselves most commonly the victims.

From *British Medical Journal*, No. 4733:724-725 (Sept. 22) 1951.

## MUSIC in Dental Education

JOSEPH F. JACOBS, B.S., D.D.S., Kansas City, Missouri

### DIGEST

*It has been stated that music, one of the most intangible products directly affecting the human sense organs, is also an effective stimulus in human behavior.<sup>1</sup> The knowledge of poets, psychologists, and neuropsychiatrists concerning the role of music in the emotional and behavioristic attitudes of human beings has been recognized by the University of Kansas City, School of Dentistry where a system of highly selective, "functional" music has been installed in the administrative offices, dental clinic, operating rooms, technical laboratories, and recreation rooms.*

*This article is a report of the results of the application of music in the instances cited. A survey of the effect of music on the instructor-student-patient relationship in the clinic, and a subjective study of patient behavior influenced by music are illustrated.*

### Functional Effects of Musical Stimulus

One of the primary functions of the auditory stimulus called music is in the improvement of morale. The historic role of music in sustaining the hope and spirit of the heterogeneous peoples of the world is well known. If the imagery produced by the strains of the *Marsellaise*, *Onward, Christian Soldiers*, or *Yankee-Doodle*

could be analyzed it is possible that the limits of the understanding of the effects of musical harmony would be expanded.<sup>2</sup> It is reported that in the present Korean war in beginning an attack the Chinese are spurred on by the sound of trumpets and other instrumental music.

### Former Emotional States Recreated

A carefully selected variety of melodies induces a chain reaction of former emotional states in the listener, producing a state of excitement and revitalization. Physiologically, the organism is shifted into "drive position" as a result of the simultaneous release of adrenalin and the increase in blood sugar.

*Physiologic Results*—Other physiologic activities resulting from auditory stimuli are cited by Burris-Meyer and Cardinell<sup>3</sup> as follows:

1. The metabolism is increased.
2. Breathing is accelerated and its regularity is retarded.
3. A variable effect on blood volume, pulse, and blood pressure is produced.
4. Fatigue is reduced or delayed, thereby increasing muscular endurance.
5. The threshold for sensory stimuli of different modes is lowered.
6. Voluntary activities, such as typing or writing, are speeded up.
7. Attention is facilitated.

8. The extent of muscular reflexes employed in writing and drawing is increased.

9. The electrical conductivity of the body as manifested by increased fluctuations of the psychogalvanic index is influenced.

10. The Harvard Fatigue Laboratory experiments indicate the possibility that certain kinds of music for certain people can sustain attention to prolonged psychomotor performance above and beyond the effects of drugs.

*Effect of Noise in Dental Clinic*—In the average dental clinic noise has the following results: (1) the level of operating efficiency is lowered, (2) tension is increased, (3) psychic distress is introduced, (4) the highly apprehensive patient experiences exacerbations of the nervous system, and (5) students' approach to the problems of clinical practice is hampered.

### Survey of Reactions

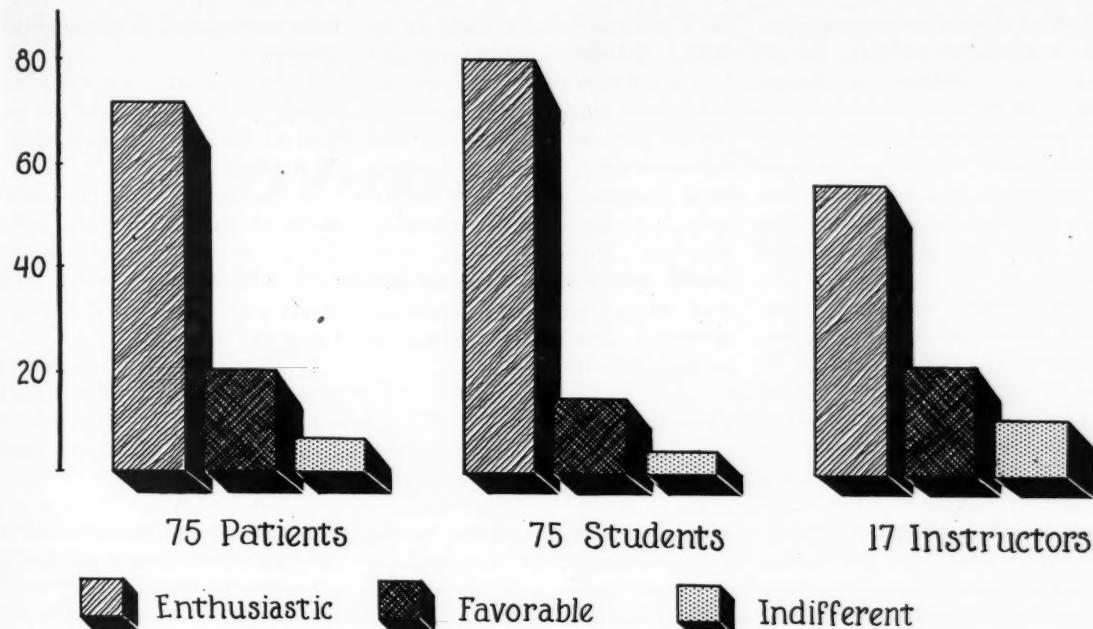
The effect of displeasing sound and music in relation to physiologic and emotional conditions has been thoroughly studied. The industrial implications of the subject with emphasis on the esthetic aspects and the annoyance potential have received attention.

A sound considered to be a noise by the listener had an undesirable effect with the exception that in certain modern music the introduction of dissonance as contrast was not unpleasant. The latter effect, however, was measured by well persons; it is generally conceded that for hospital programs jazz and similar types of

<sup>1</sup>Ibid., p. 347.

<sup>2</sup>Burris-Meyer, Harold, and Cardinell, Richmon L.: The Place of Music in Healing, J. Acoustical Soc. America 17:232-235 (January) 1946.

<sup>3</sup>Crane, George: Psychology Applied, J. Psychol. and Psychiat. 17:344-347 (January) 1933.



stimulating music are to be avoided.

**Definition**—Soibelman<sup>4</sup> has published a critical summary of available studies pertaining to the effect of noise on human beings, emphasizing primarily noise as unwanted or dis-

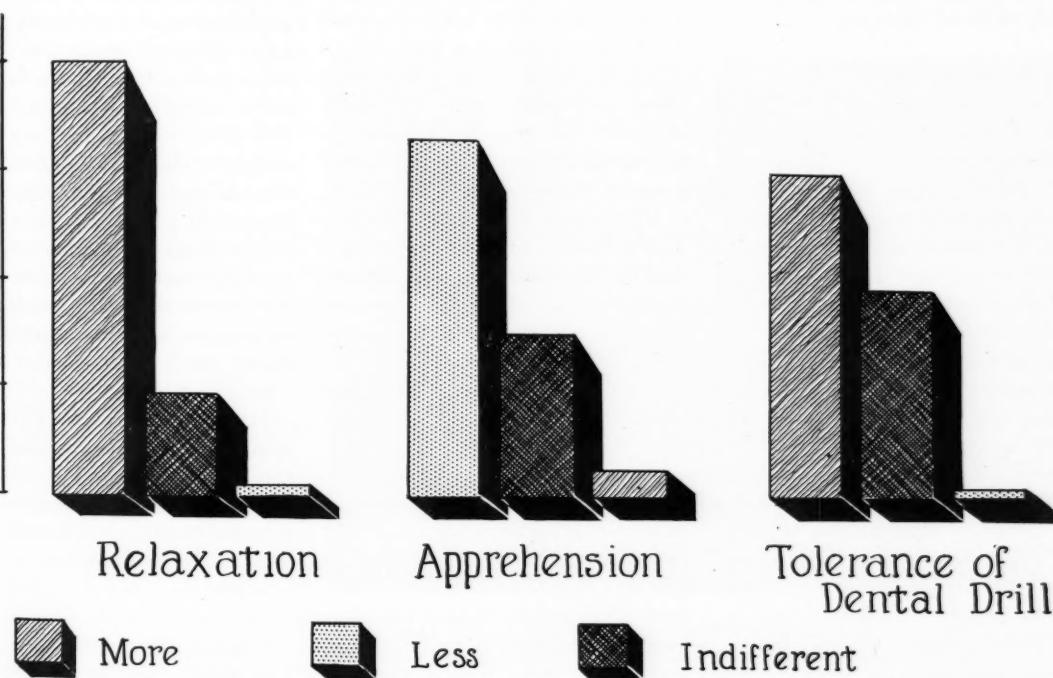
Soibelman, Doris: New York, Columbia University Press, Therapeutic and Industrial Uses of Music, 1948, pp. 201-202.

**1. Limited observation of the effect of music on the instructor-student-patient relationship indicates the results shown in this chart.**

**2. A subjective study of patient behavior influenced by music.**

agreeable sound, the degree of irritation ranging from zero to some maximum point. Procedures in measuring noise, factors affecting the annoyance, and stimulation of deafness by noise are discussed. Berrien states:

"Even though no experimental studies have been reported dealing



with effect of noise on emotional control or emotional stability, the reports . . . indicate physiologic changes of the kind associated with emotional disturbances. Many of the changes noted in response to noise are similar to, if not identical with those produced by stimuli exciting fear, anger, and general emotional tension . . .

"The available scientifically controlled studies are not in complete agreement but tend to show ill effects in output, speed of work, or vital processes . . . Marked individual differences in susceptibility to the ill effects of noise have been noted but no reported attempts have been made to correlate these differences with other facets of personality. The factors determining annoyance have not been subjected to thorough analysis."

*Aid to Efficiency*—Sumner<sup>5</sup> reports

the following: "Studies made by the British Broadcasting Company and by other British researchers as to the influence of music upon industrial efficiency indicate unequivocally that music can aid production by boosting tired workers, acting as a mental tonic, relieving boredom, increasing happiness, improving health, minimizing conversation, relieving nervous strain, and cutting down absenteeism, provided the music is properly selected."

### Conclusions

1. The preliminary study just concluded represents a concerted interest of the dental school administration in optimum conditions relevant to the health, welfare, and happiness of

<sup>5</sup>Kaplan, Lionel, and Nettel, Reginald: *Music in Industry*, London, Biol. Hum. Affairs, 1948, pp. 129-135.

those participating in the educational program.

2. The specially prepared "functional" music has reduced the noise level of the clinic by approximately 50 per cent.

3. The evaluation of the effect of music on student efficiency, morale, fatigue, and temperament cannot be made until a more thorough investigation can be conducted through a time-tested analysis.

4. There has been a noticeable increase in student concentration in the clinic and technical laboratory. Patients have acquiesced more readily to dental operations.

5. This preliminary attempt to inject artificially controlled stimuli into the patient environment presents several vistas of investigation.

*University of Kansas City  
School of Dentistry.*

## Surgery Without Fear

WITHIN THE present half century men of medicine have cooperated in their desire to make the patient safe for surgery. This era encompassed pre-operative care, blood transfusion, and study of blood chemistry.

### Modern Surgery

In modern surgery, not only is the patient made safe for surgery physically, but he is prepared mentally for the operating room. He is totally equipped in both his "psyche" and his "soma" as a psychosomatic entity to undergo a major surgical procedure.

*Mental Aspect of Surgery*—The general acceptance and application of the mental aspect of surgery are of recent origin. In years past it was common for the thyroid surgeon to subject his patients to surgery without their knowledge of the exact day of operation. Operating upon a patient who was free of anxiety, and fears of surgery obtained excellent results in thyroid surgery.

*Present Mental Unrest*—In the tempestuous years in which we live

the mental anguish seen preoperatively is no longer identified with thyroid patients alone. It may be associated with any type of surgical procedure.

*Basis in Physiologic Facts*—The mental aspect of the surgical patient has found expression in Hans Selye's Adaptation Syndrome (*Acta Inc.*, Montreal, Canada, 1950). The mechanism of this concept concerns an alarm stimulus which is instituted by surgery, severe accidents, or toxicity.

*Mechanism*—The stimulus encourages the anterior pituitary to produce ACTH, which in turn stimulates the adrenal cortex. This in turn secretes corticoids which depress the adrenal gland with a diminishing adrenal cortex response to stress conditions which may result in death from glandular exhaustion.

*Source of Mental Disturbances*—Constant or repeated glandular imbalance may be the source of mental disturbances in surgical patients. In this situation there have been advocates of therapeutic measures to counteract this exhaustion by the administration of lipo-adrenal cortex.

### Medication for the Surgical Patient

The best medication is simple assurance and the preservation and augmentation of confidence on the part of the patient for his doctor and surgeon. This encouragement of confidence finds completion in the preservation of the time-honored doctor-patient relationship.

*Surgery Made Safe*—It is now the duty of modern surgeons to prepare the patient both physically and mentally so that he may be safe to receive the full benefits of modern surgery. The concerted efforts of medicine and surgery have made available to humanity the promise of cure in many diseases.

*Freedom of Choice*—Without restraint from political influence and with freedom of action the patient of today should be prepared to accept the benefits of medical knowledge and surgical skill without fear.

Adapted from *Medical Times*  
79:643-644 (October) 1951.

## JUVENILE PROSTHESIS

### for the General Practitioner - Part One

LOUIS B. KELSTEN, D.D.S., Newark, N. J.

#### DIGEST

*Although pedodontics is a comparatively recent addition in dental education, dentistry has rapidly progressed beyond the point where extractions and simple restorations are the only forms of treatment available for children. Complete dental rehabilitation for the child is recognized today as a requisite for the proper growth and development of the juvenile dentition.*

*A dentist who accepts a child patient should be informed of the morphology of the primary teeth and their operative procedures and the various stages of the development of occlusion. These phases of juvenile treatment are discussed in this three-part article of which this is the first installment.*

*In this installment the author considers the psychology used in parent education and the means of increasing the child's confidence. The major considerations in space maintenance are described and the various situations requiring this orthodontic measure are discussed in detail.*

#### Dentist-Child Relationship

Much is heard about the importance of treating children as an aspect of practice building. Actually, children should be the backbone of any general practice. It has been estimated that only 15 to 20 per cent of adults remain permanently in a practice. But most children will continue with

a dentist who makes an honest effort to handle them properly.

*Parent Cooperation Essential*—Practice building with children is frequently misinterpreted as meaning the treatment of children on a "half fare" basis. However, when it is explained that dental treatment for children can be complicated and time consuming and that much of the periodontal disease so prevalent in adults can be prevented, parents will make sacrifices to obtain proper dental care for their children. They will see that their children are punctual in keeping appointments and answering recalls and will make prompt payment of dental expense.

*The Initial Visit*—A common cause of difficulty in handling children is the mistake of attempting cavity preparation during the initial visit. Many innocent-looking cavities are close to a pulp horn or even have pulp exposures. Unless there has been a thorough radiographic examination, a child can be severely hurt during cavity preparation and thus become a problem patient.

*Use of X-rays*—The dentist can make a more accurate diagnosis by use of x-rays and will therefore be in a better position to educate the parent as to the child's needs. By taking x-rays during the initial visit, the conditioning of the child for treatment has begun as there has been no pain although the dentist has had his fingers in the child's mouth.



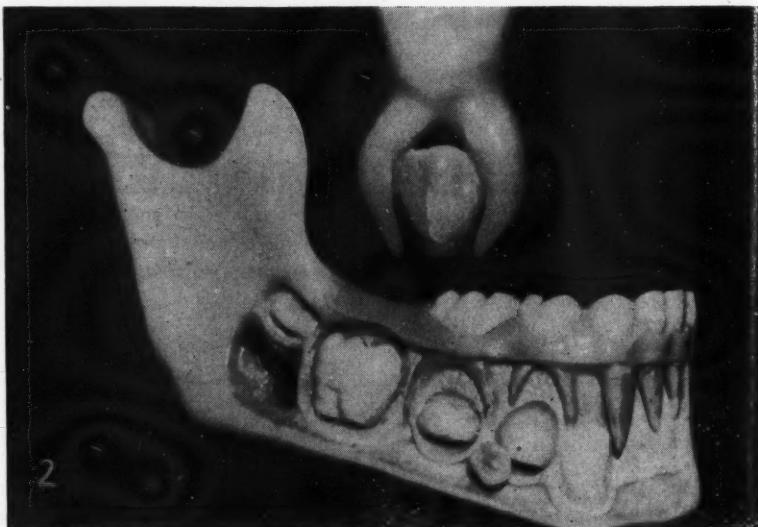
**1.** X-rays and study models aid the dentist in obtaining a thorough diagnosis in addition to inducting the child gradually and painlessly into the role of dental patient.

**Subsequent Visits**—By showing the child the instruments and explaining their uses and by treating simple cavities at first, in subsequent visits the dentist can dispel any fear. Having gained a child's confidence through such treatment more complicated procedures can be performed later, such as pulpal therapy and large compound restorations. With proper handling most children make excellent patients and are usually more easily controlled than adults.

**Further Steps**—After the need for x-rays is understood, the parent can be shown a set of study casts. (1) Oral habits, (2) teeth in supraocclusion, and (3) "plunger" cusps which might break or drive restorations from the teeth are some of the facts learned from this important diagnostic aid. By means of x-rays and study casts the dentist can make a thorough examination which will be helpful in making a sound treatment plan while gradually inducting a child into the role of dental patient (Fig. 1).

**Additional Aids in Education**—Later, when the parent is told what the child's dental needs are it is advisable to use visual aids such as charts and models (Figs. 2, 3, 4, 5, and 6). The spoken word is rarely sufficient in teaching the parent. During the consultation it is wise to encourage the parent to join in the discussion of the diagnosis and proposed treatment. Only when an understanding of the dental requirements of the child is revealed by the parent should the dentist mention the fee. When the treatment plan and fee have been found acceptable, a payment schedule and appointments can be arranged.

**Presence of Parent not Desirable During Treatment**—Parents will intervene at the slightest protest of the child and should firmness during treatment be required the parent naturally resents seeing the child disciplined. When the child cries no attention should be paid to his crying. This is a natural defense and will soon stop if the child sees that it does not bring the desired results. For distraction the child is shown the rotating instrument which is run on



**2. Model of mandible of child of four which is an invaluable aid in educating the parent in the dental needs of the young patient. The distance from the mesial of the unerupted six-year molar to the midline of the arch is never increased after the age of two; therefore, the deciduous teeth play a vital role in maintaining this distance for the permanent teeth.**

his fingernail so that he can see how it "cleans his tooth."

**Procedure at First Visit**—It is wise to prepare and restore only a small pit cavity at the first visit. The mother and the patient are then shown the silver in the child's tooth. A silver restoration, no matter how small, is considered a permanent restoration. Both are therefore pleased with the success of the visit and look forward to the next appointment.

**Gradual Increase of Confidence**—At the next visit the child can be conditioned for more complicated procedure by making a larger restoration or a couple of pit amalgams. With each visit procedure can be increased, thereby inspiring the parent with confidence in the ability of the dentist to deal with the child. Nothing creates better public relations for a dentist than pleasing a parent and gaining the enthusiastic support of a child.

### **Major Considerations in Space Maintenance**

In a study of 119,000 St. Louis school children it was found that 51 per cent had malocclusions, of which 80 per cent were preventable. Sta-

tistics released by the Department of Pedodontics of New York University, College of Dentistry reveal that up to 65 per cent of all malocclusions are associated with prematurely lost deciduous teeth. According to McBride<sup>1</sup> over 50 per cent of all orthodontic needs resulted from the early loss of teeth. Brandhorst<sup>2</sup> claimed, however, that 20 per cent of premature extractions resulted in malocclusion. Willett<sup>3</sup> stated that this figure should be 28 per cent, whereas Foster<sup>4</sup> set the percentage at 65.

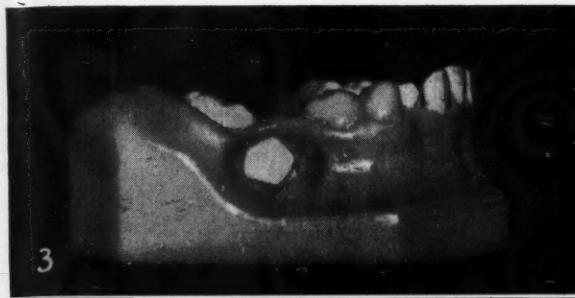
**Importance of Space Maintenance**—Despite the difference of opinion concerning the result of the premature loss of primary teeth, it is the dentist's responsibility to educate the parent as to the need for space maintenance. Unfortunately, there is a tendency to minimize the need for space maintainers. As a result, many dentists are reluctant to use a pre-

<sup>1</sup>McBride, Walter C.: Juvenile Dentistry, Philadelphia, Lea and Febiger, 1947, p. 266.

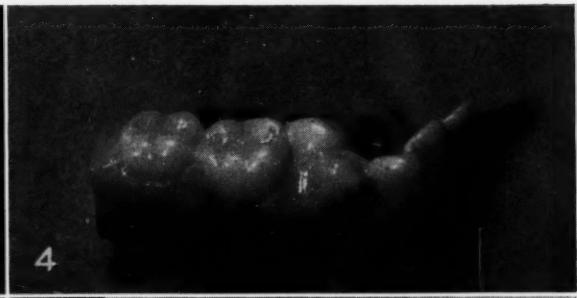
<sup>2</sup>Brandhorst, O. W.: Promoting Normal Development by Maintaining the Function of the Deciduous Teeth, J.A.D.A. 19:1196-1203 (July) 1932.

<sup>3</sup>Willett, R. C.: Premature Loss of Deciduous Teeth, Angle Orthodontist 3:106-116 (April) 1933.

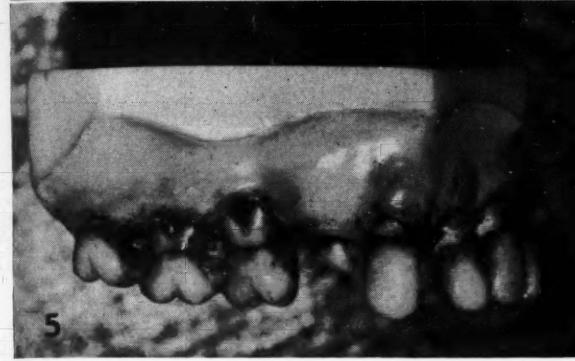
<sup>4</sup>Foster, C. S.: Functional Space Maintenance Has Its Place in Dentistry for Children, J.A.D.A. 23:1052-1058 (June) 1936.



3



4



5



3. Result of loss of the second primary molar. The forward drift of the erupted six-year molar has begun to block out the second bicuspid.

4. Section of the mandibular arch showing blocked out bicuspid as the result of the premature loss of the second primary molar.

5. Model revealing periodontoclasia which frequently results from the neglect of the primary dentition.

6. Vertical loss of space resulting from the extrusion of the maxillary second primary molar due to the premature loss of the second mandibular primary molar.

ventive appliance in a child's mouth.

**Evidence Revealed in Case Reports**—It is shown in many case reports that the multiple loss of deciduous teeth did not result in space closure. Salzmann<sup>5</sup> states that even where spaces have closed they have been reopened by erupting bicuspids. He reasons, therefore, that a space maintainer should be used only after the child is under observation and there has been marked closure of the space.

**Possibility of Space Closure**—Due to the eruptive forces of the permanent teeth and the forward movement of the developing jaws, where a primary tooth is prematurely lost there is the possibility of space closure with a lack of alveolar development and occlusal disharmony in that area. The over-use of teeth on the side opposite an extraction predisposes them to caries and breakdown. Where

spaces are reopened by erupting teeth, tooth alignment, particularly in the anterior segments of the dental arches, is adversely affected. In a schedule of periodic checkups the child may miss a recall. When he does return the space will have closed to the extent that orthodontia is required.

**Prevention of Malocclusion**—Frequently, after a space has closed, blocking out a permanent tooth (Fig. 4), parents have complained that they were not informed of the necessity for space maintenance following the loss of a primary tooth. Many malocclusions which take years to correct and are a burden on the child and on the financial resources of the family might have been prevented by the use of a space maintainer. Also many cases of hopeless adult periodontoclasia could have been prevented by the sound application of space maintenance (Fig. 5).

**Loss of Space Cause for Concern**—The average combined widths of the primary molars and cuspid exceed the average combined widths of the permanent cuspid and bicuspids by only 1.7 millimeters in the mandible and 0.9 millimeters in the maxilla. For this reason the possible loss of space in a child's mouth must be viewed with concern. It is the slight deviation from normal during dental development and arch growth that results in the marked malocclusions prevalent in older children.

**Factors Involved in Development of Jaws**—Following the premature loss of a primary tooth the shifting of the remaining teeth is due to the inherent lines of stress on the growing jaws caused (1) by the muscular pressure of mastication and deglutition, and (2) by the occlusal and mesial erupting force of the six-year molars. Normally it is these forces that aid (1) in the development of

<sup>5</sup>Salzmann, J. A.: *Principles of Orthodontics*, Philadelphia, J. B. Lippincott Company, 1950, pp. 280, 680.

the jaws and (2) in the establishment of the occlusal relationship of the erupting teeth.

**Pressure Transmitted**—The contraction of these muscles creates pressure which is transmitted from the mandibular basal arch to the maxillary basal arch establishing the intermaxillary relationship; the occlusal and mesial erupting force of the six-year molars influences the forward growth of the developing jaws.

**Forces Creating Disharmony**—Where a primary tooth is prematurely lost the six-year molars drift forward while the section mesial to the space lags behind in its forward development with a resultant closure of the space (Fig. 3). Because of abnormal function during mastication and deglutition, muscular forces create disharmony between the upper and lower basal arches of the developing jaws.

**Postextraction Changes**—Shifting, rotation, inclination, and continuous eruption of the teeth adjacent to the space left by the extraction are the manifest postextraction changes. Permanent teeth tend to erupt too early or are apt to follow the primary teeth in shifting and tipping, thereby predisposing them to early caries and breakdown.

**Employment of Space Maintenance**—Where a child's mouth reveals a malocclusion the premature loss of a primary tooth can lead to a grave orthodontic problem unless space maintenance is employed in the following situations:

1. In the loss of a primary tooth where there is an undeveloped jaw with crowded and overlapping large anterior teeth.

2. In the loss of a mandibular primary molar or cuspid where there is a Class 2 malocclusion.

**Results From Early Loss of Teeth**  
—1. Loss of a maxillary primary incisor rarely results in a malocclusion because of physiologic growth that normally takes place in the anterior section of the upper jaw.

2. Where two or more upper primary incisors are prematurely lost there may be (1) a closing of the space, (2) a forward thrusting of the tongue into the space creating an

open bite with a permanent speech defect, and (3) a possible shifting of the mandible.

3. Early loss of the mandibular primary incisor may result in a constriction of the space with subsequent crowding of the permanent incisors and deep overbite.

4. Premature loss of the primary cuspid through an extraction or an ectopic eruption of the permanent lateral frequently results in closure of the space (1) by the mesial movement of the molars, or (2) by the lingual shift of the incisors, particularly in the lower jaw.

5. Where a primary cuspid is lost prior to the eruption of the permanent lateral, the lateral frequently erupts into the space intended for the permanent cuspid. According to studies made by the Department of Pedodontics of the New York University, College of Dentistry, the premature loss of the primary cuspid will result in the space closing in 80 per cent of the cases with a resultant dentofacial abnormality.

**Early Loss of First Molar**—It is possible that intercuspal relationship and the type of occlusion are responsible for maintaining the space in early loss of the first primary molar. Brauer<sup>6</sup> reports that 34 per cent of first primary molars prematurely extracted resulted in a malocclusion (Fig. 7). At the Dental Section of the Beth Israel Hospital in Newark, New Jersey, over a period of three years in which 50 cases involving the premature loss of the first primary molar were observed, the author found the spaces closed in 30 per cent of the cases. Even in cases where there was a reopening of the space when the permanent teeth had erupted, the occlusion was affected in the anterior part of the jaws, ranging from deep overbites to rotated and overlapping maxillary lateral incisors.

**Early Loss of Second Molar**—It is universally agreed that space maintenance is necessary in order to prevent a forward movement of the six-year molar where the second primary molar is prematurely lost (Fig. 8). Brauer<sup>7</sup> states that 59 per cent of prematurely lost second primary mo-



7. Complete closure of space due to the premature loss of the first primary molar.

8. Impaction of the second bicuspid as a result of the premature loss of the second primary molar.

lars resulted in a definite malocclusion. Cohen<sup>8</sup> found that the early loss of the second deciduous molar was followed by space closure with a blocking out of the second bicuspid in 40 per cent of his cases.

**Loss of Mandibular and Maxillary Molars**—The premature loss of both primary molars of a quadrant increases the possibility of the blocking out of one of the bicuspids. Multiple loss of the mandibular and maxillary primary molars may also result in a mesial shifting of the mandible in order to improve the efficiency of mastication (Figs. 9 and 10). Where the primary molars are lost, in order to find a more functioning position the mandible will frequently shift laterally, creating a crossbite. Where the mandibular primary molars are lost, the mandibular incisors are usually lingually displaced.

**Widening of the Mandibular Arch**  
—There may also be a flattening or enlarging of the tongue into the distal areas with a subsequent widening of the mandibular arch as the permanent teeth erupt, creating disharmony.

<sup>6</sup>Brauer, J. C.: Dentistry for Children, Philadelphia, Blakiston Company, 1947, p. 343.

<sup>7</sup>Ibid., p. 344.

<sup>8</sup>Cohen, J. T.: The Selection of Cases for Space Maintainers, Northwest Dent. 20:75-84 (April) 1941.

between the upper and lower jaws. There may occur a distal shifting of the primary canines with (1) a rotation of the permanent lateral incisors, and (2) a lingual shifting of the maxillary incisors so that they are in edge-to-edge or even lingual relationship to the mandibular incisors.

### **Situations Requiring Space Maintenance**

1. All permanent teeth except third molars when lost must have their spaces maintained if a malocclusion is to be prevented.

2. Space must be maintained where the six-year molar is lost during the eruption of the second bicuspid as the bicuspid may erupt into the space through the socket of the extracted tooth at a distance considerably distal to the first bicuspid.

3. Where a primary canine, molar, or a combination of these teeth has been lost, it is advisable to protect the child with space maintenance if the succeeding tooth or teeth will not erupt within six months. This period of time can be judged by the following conditions: (1) If there is bone covering the succeeding tooth or teeth. (2) If the succeeding tooth or teeth have less than one-half root formation.

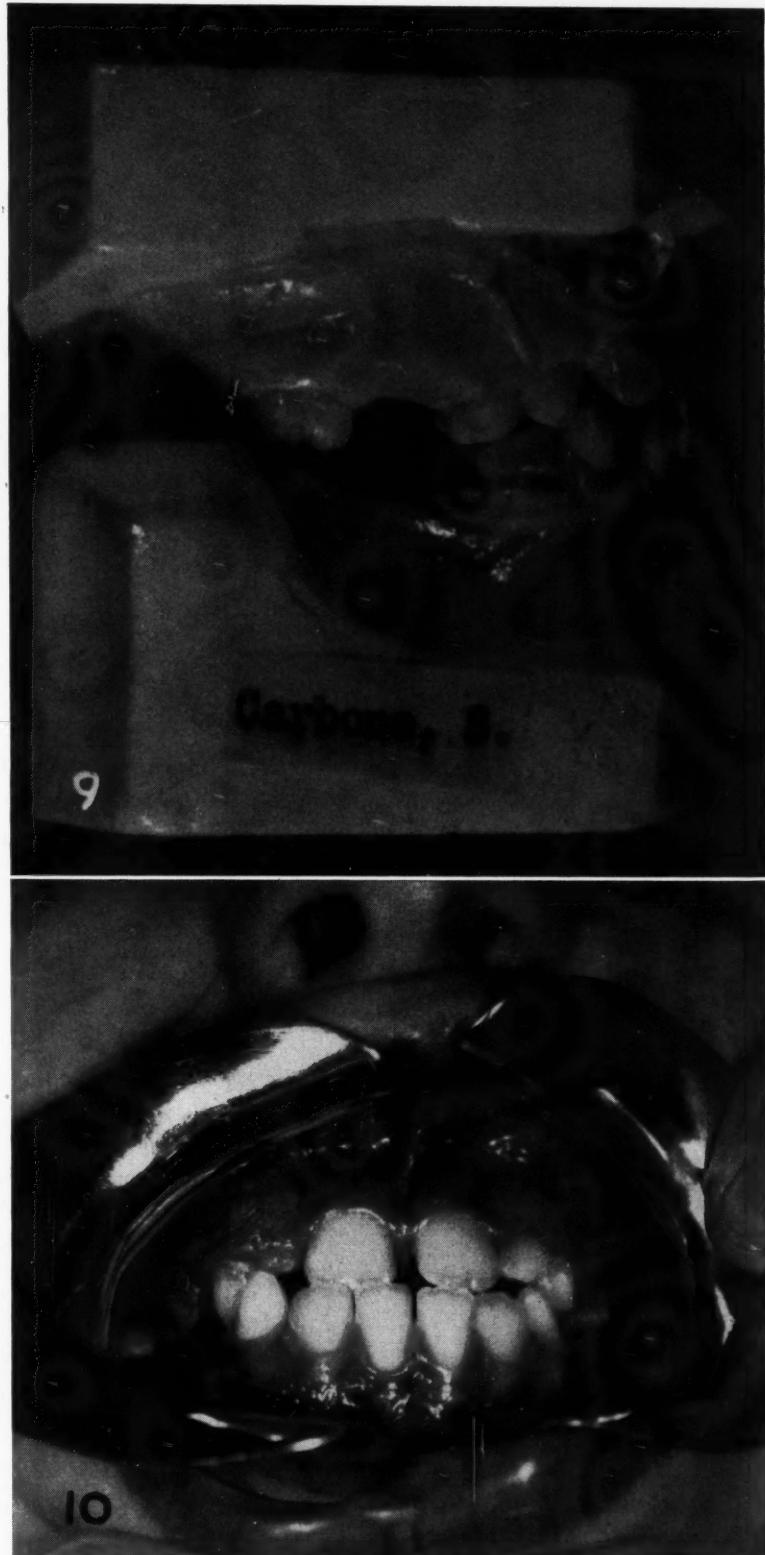
### **Observation May be Indicated**

Where the dentist prefers to observe a child who has prematurely lost a mandibular incisor or two or more maxillary anterior teeth, he should impress upon the parent the necessity of returning with the child for periodic monthly inspection to ensure early detection of (1) space closure, (2) a tongue habit, or (3) the forward shifting of the mandible. Frequently, parents are inclined to forget or even misunderstand professional advice, especially when it is offered in a preventive vein.

### **Conclusion**

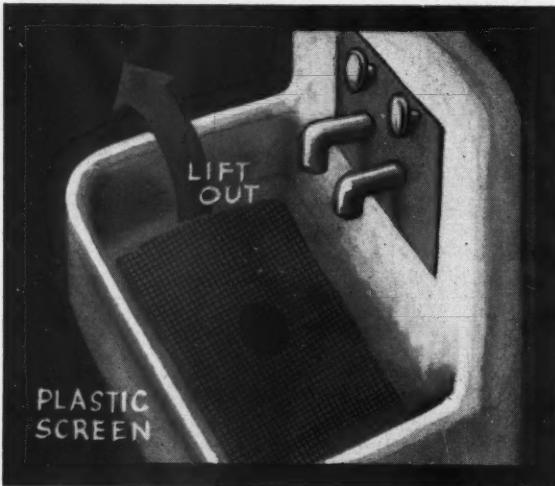
Loss of any permanent tooth, with the exception of the third molar, requires space maintenance until the child is sufficiently mature for fixed bridgework.

299 Clinton Avenue.

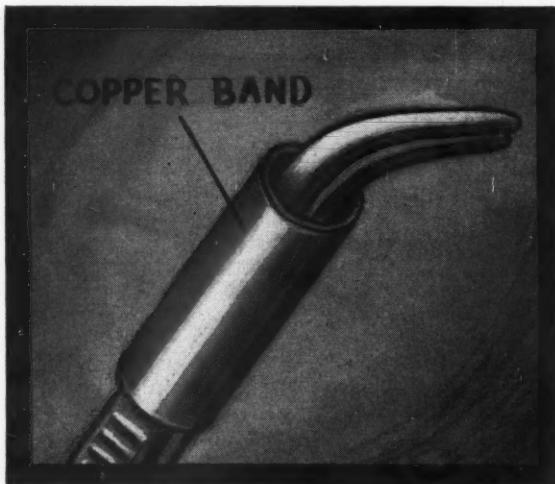


**9. Anterior shift of the mandible as a result of the loss of the primary and permanent posterior mandibular teeth.**

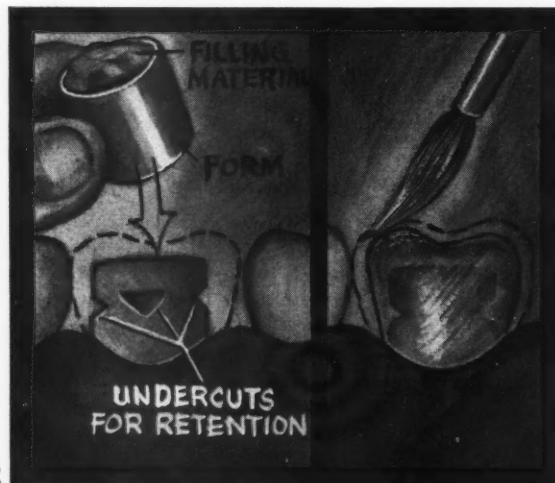
**10. Anterior and lateral shift of the mandible resulting from the loss of the maxillary and mandibular primary posterior teeth.**



1



2



3

## Clinical and Laboratory

### To Prevent Clogging of Laboratory Sink

Robert R. Goodhart, D.D.S., Philadelphia

**1.** Place a piece of plastic screening in the laboratory sink to prevent plaster, stone, and other materials from going down the drain. It is a simple matter to lift the screen and shake the particles into the waste receptacle.

### Storing Cotton Pliers

Louis X. Freeman, D.D.S., Mount Vernon, N.Y.

**2.** Cotton pliers, when stored in the instrument cabinet, will often open and spread out to prevent the drawer from opening. Locking the beaks with a copper band will stop this annoyance.

### An Immediate Plastic Crown on a Posterior Tooth

Joseph D. Lieberman, D.D.S., New York

**3.** Prepare the tooth as for a jacket crown with some additional retention. Adjust an aluminum shell to proper fit and occlusion. Fill the shell with one of the self-curing acrylics and carry to position. Allow to set for fifteen minutes before removing the shell. The crown will be of cylindrical form. Cusps and contour may be developed in the following manner: with a sable brush dipped in monomer pick up some warm polymer and apply to the cylindrical form to produce anatomy.

### READERS are Urged to Collect \$10.00

For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay \$10.00 on publication.

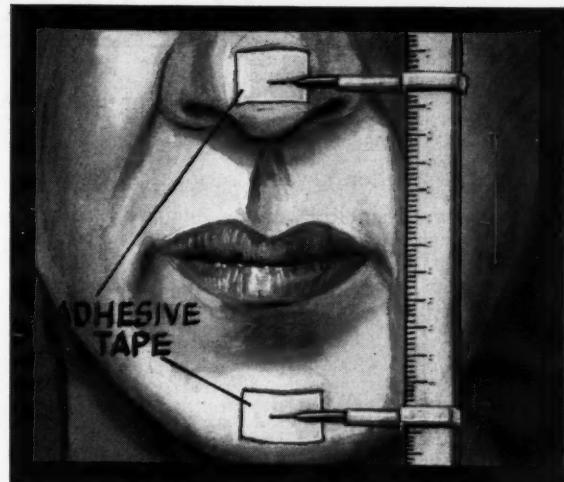
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

## SUGGESTIONS . . .

### A Convenient Marking Method in Obtaining Vertical Dimension

Maurice J. Teitelbaum, D.D.S., Newark, N.J.

4. Place a small piece of adhesive tape on the patient's nose and chin. Make guide marks on the adhesive tape. This prevents smearing the face and the annoyance to the patient of rubbing markings from the skin.

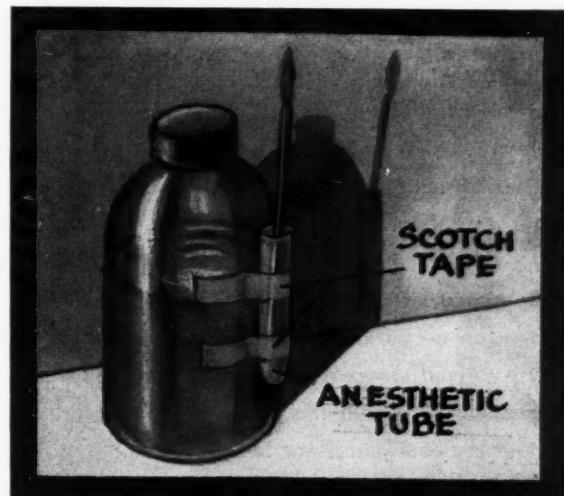


4

### Storing Brushes in the Laboratory

Everett T. Nealey, D.M.D., Exeter, N.H.

5. To keep brushes from contamination and with their proper bottle, attach an empty anesthetic tube to the bottle with scotch tape. The brush is placed, handle down, in the glass tube.

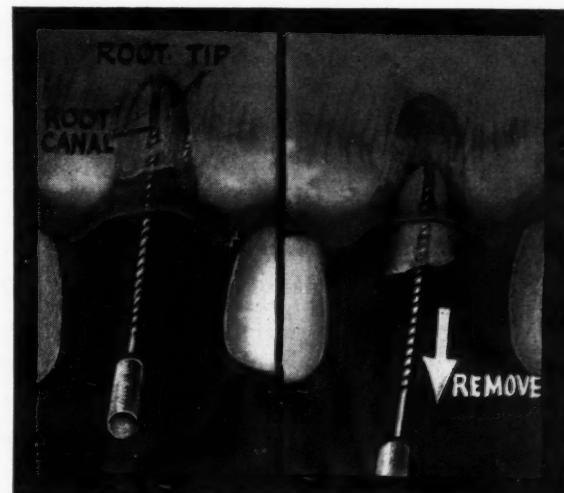


5

### Easy Removal of Root Tips

J. William Hughes, D.D.S., Miami, Fla.

6. When a root is fractured the fragment may be removed by inserting a root canal reamer in the canal.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 40 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

## The EDITOR'S Page

PERSONS WHO receive x-ray or radium therapy for malignant diseases of the mouth, pharynx, head, or face very often develop serious dental lesions. These lesions include hypersensitivity, rampant caries, destruction of supporting soft tissues, loosening of the teeth and bone necrosis. And children who receive radium therapy for cavernous hemangiomas, giant cell tumors, or nevi show marked retardation of growth of the dental tissues and the jaws. The serious sequelae that follow irradiation usually make their appearance within five months or they may be delayed as long as eight years.

Cutler<sup>1</sup> in an exhaustive review of the radio physiologic mechanism, suggests: 1. Dental disturbances are the consequence of a distant action on the vascular, nerve, and endocrine elements in the cervical region. This suggests the existence of a true sympathetic center which regulates circulation, parathyroid, and adrenal cortical secretions.

2. Roentgen and radium irradiation act directly upon bone cells, matrix, and the interosseous blood vascular network. Secondary radiation given off by the irradiated calcium particles of bone exerts a caustic action on the periosteum, especially its osteoblasts and capillary blood vessels.

3. Radiation sensitizes bone, definitely diminishes its resistance to infection, and retards its repair once infection has been established.

4. In the presence of a neglected mouth the irradiation produces a stomatitis, further reduces the blood supply to the periosteum and bone, decreases bone cell activity and resistance to infection. Thus the stage is set for the invasion of pathogenic organisms.

5. Irradiation may predispose to caries because of the severe diminution of the salivary flow. One observer at the Curie Institute reported that the saliva of patients undergoing roentgen therapy became rapidly acid. Two observers from the Mayo Clinic "noted that a surprisingly large number of

patients who had received irradiation which has affected the salivary glands, acquire the habit of holding fruit drops or other acidified confections in their mouths almost continuously to relieve a sensation of dryness or a metallic taste."

So far as treatment is concerned Cutler states:

"Numerous opinions have been expressed on the relation of the type of irradiation to postirradiation dental lesions and osteoradionecrosis of the jaws. Regato thinks that since the mechanism of dental lesions is largely an indirect one, it is of little value to protect the teeth during irradiation and that one should attempt to modify the technique of roentgentherapy in an effort to avoid these lesions.

"Supervoltage radiation in Schulz's experience does not seem to have reduced radiation complications on the teeth and jaws. He suggests, however, that proper oral hygiene, prior extractions and antibiotics may result in the tissue-sparing action of supervoltage radiation becoming more evident.

"Martin and Sugarbaker believe that the incidence of dental complications and osteoradionecrosis is greatly reduced by using the smallest portal which will adequately cover the primary lesions. They also recommend cutting off the teeth rather than extracting them.

"Upon the question of removal or nonremoval of teeth prior to irradiation for cancer of the mouth and neighboring regions, no rigid rule can be made. There is unanimous agreement on the importance of removing all infected, carious, and questionable teeth. The majority of authors also agree on the desirability of extracting the teeth, good or bad, in the area to be irradiated."

Here is a warning that should be carried to every dentist who is required to treat a person who has been subject to any kind of irradiation about the head: *No extractions should be done for several years after irradiation. When conservative treatment cannot be done and extractions are necessary, full use of antibiotics should be made.*

<sup>1</sup>Cutler, Max: Osteonecrosis Complicating Radiotherapy for Intraoral Cancer, *Oral Surg., Oral Med., Oral Path.*, 4:1077-1090 (September) 1951.

# MEDICINE and the Biologic Sciences



## Speech in Children

Many parents are unduly concerned over the speech patterns of their young children. Usually, the early clonic iterations of the child between twenty and forty months are a part of the normal speech patterns of growing children. As a rule, reassurance of the parents and withdrawal of attention and concern from speech are all that is necessary.

There is a group of children who start speaking late. Their familial background shows evidence of difficulty in the language area and delay in establishing a functional superiority of one side over the other. Many of these children have trouble with the enunciation of specific sounds, with vocabulary, and with speech construction. Despite at least average intelligence, these children handle speech poorly.

Often they show a great number of clonic iterations at an age when most children handle speech promptly. Their handling of speech closely resembles the cluttering of older children and adults. Such children frequently need technical help with sounds, vocabulary, and grammatical

construction. Smoother production of speech and slowing up of speed will often bring about a reduction in the original iterations. It is important to recognize the fact that emotional tensions and conflicts tend to become fixed to a speech mechanism which is none too stable in these children. The cluttering may easily turn into stuttering.

Occasionally children are seen who show no functional difficulty in the language areas, who talk early and quite well, but who abruptly begin to

stutter at some time during childhood. Some of these children display other symptoms of emotional disorder; others seem to function effectively in most areas but express their emotional conflicts principally in stuttering. These children should be referred for psychiatric help early.

For older children who stutter, a careful differential diagnosis is necessary as to the relative importance of specific language and emotional factors in pathogenesis. If existing emo-

(Continued on page 36)

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Chart 3—The Progress of Tooth Decay: Three large full-color illustrations show a small cavity starting in the enamel and carry through to the final result: general systemic disease.

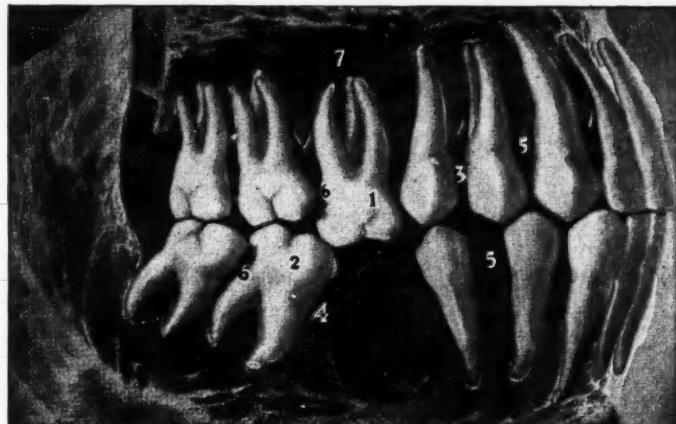
Chart 4—Why Construct a Bridge?: Dentists tell us that many patients have been convinced by this single chart—a full-color illustration of normal conditions contrasted with graphic proof of what happens when a needed bridge is not provided. This chart alone can be worth infinitely more than the cost of the chart book. Many dentists have found this to be true. (See cut.)

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Chart 8—The Development of Root-End Infections: Four large full-color illustrations present facts that patients would otherwise not comprehend, and would accordingly neglect treatment.



Part of Chart 4, showing the patient what happens when a tooth is not replaced.

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## In your ORAL HYGIENE this month



Between the end of the year and the income tax deadline in March, most of us find ourselves highly "money conscious." We make good resolutions concerning our business methods, our records, our investments—but often we don't know quite where or how to start putting these resolutions into effect . . .

Oral Hygiene, in the January issue, offers some suggestions that may prove helpful.

If, for instance, you've been wondering whether your fees are too low—or too high—read Doctor Meyer Silverman's analysis of costs and fees. (This is the first of two parts.) All young dentists starting practice will find the article helpful . . . Established practitioners too—in these days of increasing inflation—will probably be interested in checking their present fee scale on the basis Doctor Silverman recommends.

★ ★ ★

Before you file your tax returns, be sure to read, "Casualty Losses Are Deductible in Tax Returns." It's an article that may save you money. Harold J. Ashe explains how a complete record of property-damage repairs insures a tax savings for the dentist. (Of course the time to read the article is *before* your property is damaged by fire, flood, or storm.)

★ ★ ★

If your summary of 1951's financial operations indicates that you could profit by more information on securities, read John Y. Beaty's article, "How to Get Help in Selecting Securities."

His advice is sound and practical.

★ ★ ★

Perhaps you find that your yearly figures reflect a high turnover of patients. Don't let this fact worry you too much: most of your fellow-practitioners are in the same position. Doctor C. W. Garleb estimates that the average dentist keeps *only 15%* of his patients longer than two years! The article, "Why Patients Desert Dentists," gives some of the reasons for patient loss—and suggests ways in which the individual dentist may solve this practice problem.

★ ★ ★

Of course you may be one of the very lucky dentists who have no financial worries . . . Don't skip the January issue thinking, "That's not for me." There's plenty of good reading with no dollar signs attached. There's the article, "Teeth and Tombstones"—Doctor G. George Field's discussion of focal infection and, on the same subject, "Focal Infection—Here We Go Again" by Doctor David T. Parkinson.

★ ★ ★

Then, for human interest, there's the account of the American dentist who was recently married (to an American girl) in Moscow. Marriages are—as you might expect—quite different in the land of Stalin.

★ ★ ★

The regular departments: "So You Know Something About Dentistry!" "Dentists in the News," "Ask Oral Hygiene," "Technique of the Month," and all of the other monthly features round out a first-of-the-year issue that sets a good pace for 1952.

(Continued from page 33)

ditional difficulties seem to be the result rather than the cause of the stuttering; a more specific and technical therapy is favored. A psychiatric approach is recommended in cases in which emotional factors are outstanding.

Speech is a means of expression of the personality as well as a means of conversation. Severe dysfunctions in speech may reflect a personality disorder or a disorder of interpersonal relations or both. In the child, however, speech is also a tool which he masters as it develops. A speech defect in the growing child must be evaluated from both points of view.

*Hirsch, Katrina De, and Langford, William S.: Clinical Note of Stuttering and Cluttering in Young Children, J. Pediat. 5:934-939 (June) 1950.*



### Selection of Antibiotics

There are five antibiotics in common use today: (1) penicillin, (2) streptomycin, (3) aureomycin, (4) chloramphenicol, and (5) terramycin. Each one has a definite place in therapeutics.

Penicillin continues to be the antibiotic of choice for the treatment of all gram-positive infections due to staphylococci, hemolytic streptococci, pneumococci, and subacute bacterial endocarditis due to nonhemolytic streptococci. It is the drug of choice for the treatment of all cases of gonorrhea and syphilis.

The present trends are to use either the oral dosage forms or the procaine salt of crystalline penicillin G in aqueous solution. There is less sodium and potassium penicillin G in aqueous solution being used for parenteral therapy. The tendency is to increase the total amount of penicillin given with each injection or by mouth and to lengthen the interval of time between doses.

The most potent agent against tuberculosis is streptomycin. No drug and no other antibiotic approaches it in potency. Its action may be assisted by PAS, TB, or the sulfones. However, none is superior.

Chloromycetin is the best anti-infective drug for the treatment of typhoid fever. None of the other antibiotics are nearly so effective. All cases of typhoid fever should be treated with this agent. This effect can be accelerated by simultaneous administration of cortisone.

Aureomycin and terramycin are more potent than chloromycetin against gram-negative infections than against gram-positive infections. All three antibiotics have a positive action against both gram-positive and gram-negative microorganisms.

All three of these antibiotics are equally active in the treatment of the rickettsial diseases, primary atypical pneumonia, lymphogranuloma venerum group of viruses as well as in granuloma venereum and mixed urinary tract infections.

There is little choice between aureomycin, chloromycetin, and terramycin in the treatment of undulant fever. There is some evidence that combining any one of these agents with dihydrostreptomycin produces better results than using any one of them alone. There are fewer relapses.

Both aureomycin and terramycin are useful in the treatment of staphylococcal infections that are resistant to penicillin. Penicillin is superior to all others in the management of hemolytic streptococcal infections.

Tularemia responds most promptly to streptomycin although aureomycin, chloromycetin, and terramycin are also useful. Streptomycin and chloromycetin are the two most potent antibiotics for the treatment of influenza bacillus infections. Chloromycetin by mouth is used successfully in treatment of influenza bacillus meningitis. Streptomycin has the most striking benefit in urinary tract infections. Amebiasis has been combated with aureomycin, terramycin, and bacitracin.

It is a common practice to use combinations of antibiotics and the sulfonamides. It is wise to select the agent that is likely to be most effective in the shortest period of time.

Keefer, Chester S.: *Evaluation of Antibiotic Therapy*, Postgrad. Med. 9:101-105 (February) 1951.

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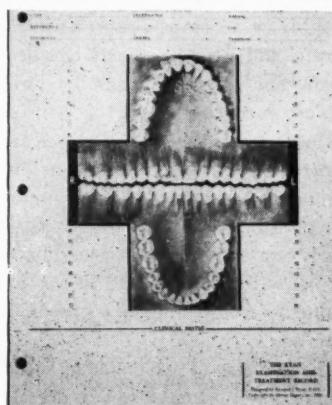
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### Permanent Records Are Important...

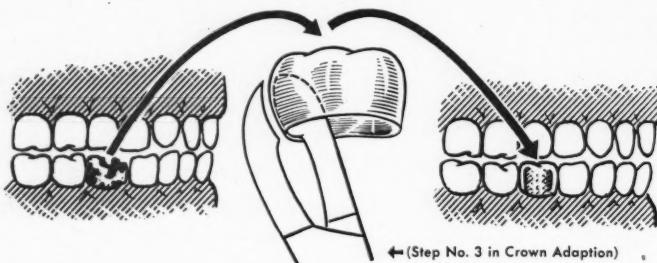
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**Allergy vs. Growth  
and Development**

It is quite well agreed that there is a definite relationship between allergy and growth and development in children. Growth failure is believed to be between two and two and one-half times more common in allergic children than in normal controls. Even though there may be continuous management of the allergy in children there frequently is disturbed growth of the afflicted as a group.

With progress in the management of allergy an improvement in the growth and development has been noted. The results, though not striking, are encouraging.

The factors of chronic illnesses and recurrent respiratory infections are commonly mentioned as being important. And, insofar as these chronic illnesses or infections may be related to allergy, control of the allergy undoubtedly would influence growth in these cases.

The sequelae of prolonged or severe asthma in children are varying de-

gresses of chronic bronchitis, emphysema, or bronchiectasis. Also the interference with nutrition may lead to permanent stunting of growth and delayed puberty. Recurrent attacks of asthma are invariably accompanied by some degree of bronchitis and cause a hyperirritability of the bronchial mucous membrane which may become chronically infected as a result. If the asthma in children is relieved one can expect the lungs to be restored to normal.

Even though present-day allergy management is not without limitations, most authorities agree (1) that the increasing progress of allergic manifestations can be arrested, and (2) severe asthma definitely minimized or eliminated in 75 to 85 per cent of the cases. In this way, certain predisposing factors to chronic respiratory infection or malformation of the respiratory tree may be minimized in susceptible individuals.

Welsh, John B.: *The Effect of Allergy Management on Growth and Development of Allergic Children*, *J. Pediat.* 38:571-575 (May) 1951.



**Mass Blood Typing**

There is a great deal of discussion concerning the desirability of typing the blood of the entire population of the United States. This is considered by some as a vital link in the civilian defense program. Such a procedure would be a herculean task. Therefore, there has been some doubt in certain quarters as to its feasibility.

Doctor Leonard A. Scheele, Surgeon General of the United States Public Health Service recently commented on the proposition. His comments probably represent the best thinking of governmental agencies and professional societies on blood typing for atomic defense. He believes that mass blood typing is not needed for atomic defense.

The only typing that should be done now is among those persons between the ages of eighteen and seventy years

who can and will give blood now for storage and who can be called on in an emergency as donors. The need is to find among such persons those donors who have type O blood that can be given with least risk to any patient regardless of his own type.

Any mass typing at this time should be undertaken "as a calculated risk and as a test of the method's effectiveness." Reasons against the mass blood typing of the whole population are: (1) The drain on man power and the supplies of typing serum; (2) the danger of errors made by hastily trained personnel; and (3) the fact that plasma and such plasma substitutes as salt water drinks which require no typing, would be used during the immediate emergency period of a large scale disaster.

No one knows what to anticipate in case of a huge emergency. The procedure of choice at the present is to administer plasma immediately and until such time as compatible blood can be obtained. In certain locations it is general practice to give recipients low titer group O blood without typing or compatibility tests. The Army has followed this policy in advanced bases.

Modern laboratory methods permit almost instantaneous typing. The big factor is that typing at the present time would present a tremendous problem in personnel and serums. Blood typing is a rather technical procedure. It is of value only when carried out with good typing serums by a highly competent laboratory technician. The current supply of technicians is drastically limited. With incompetent or substandard technical assistance, considerable confusion might occur and result in many unnecessary deaths.

Many industries and hospitals maintain lists of donors who are called when needed. These facilities might be expanded to serve a vital function in a huge emergency.

*Editorial, Internat. M. Digest 58: 309-310 (May) 1951.*

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## Girls Talk Better—and More

An enterprising observer has studied the speech of 1225 college students

and finds that the speech of the girl students is "neater, more precise, and more correct than men's, just as women themselves tend to be neater, more precise, and more correct than men." Although the speech of women is better than that of men, possibly because they have more practice, women are inclined to "hypernasal and oversibilant speech." This is a fancy way of saying that "40 per cent of the women, compared with 28 per cent of the males, lisped; 25 per cent compared with 7 had nasality; 22 per cent whined." Lisping,

CLINICAL AND LABORATORY SUGGESTIONS  
(See pages 30 and 31)

Form to be Used by Contributors

To: Clinical and Laboratory Suggestions Editor

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From: \_\_\_\_\_

Subject: \_\_\_\_\_

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talking through the nose, whining are not sounds that win masculine admirers.

The observer, in his quest to discover the cause for feminine speech deficiencies "has enlisted the interest of an orthodontist who plans to explore possible structural deficiencies in the construction of the oral cavity of men and women, a psychologist to explore the psyche of the matter."

Not for a moment would I wish to deprecate the services of the orthodontist in evaluating the oral structures. I have the feeling, though, that in the absence of severe tissue lack or destruction he will not be able to show that malocclusions are the causes of annoying speech mannerisms. The gentleman who is engaged to explore the psyche of the women is more apt to uncover the reasons for lisping and whining.

One of the most pernicious parental habits, worse by far than flailing with a rod, is talking baby talk to an infant. I have heard many women grown to mature estate who have carried their cradle lisps with them through adolescence, courtship, marriage, motherhood, and into senescence. And I must add that occasionally baby talk has been abetted by a husband.

The speech researcher in his report made no mention of the speech of women en masse, the buzz of bees syndrome. If you have ever been trapped in a "tearoom" at noon while the women are stuffing themselves before their afternoon of bridge, or as a preliminary to the diet that begins tomorrow, you will have encountered the experience: the buzz and the stinger.

My impression is that women are more addicted to the telephone than are men. At least so it seems on our farm party line. I seldom barge into the private affairs of men when I lift the receiver, but the accouchement details and the pathologic seminars that I have attended in this manner have given me wide acquaintance in the community although I have often been at a loss to know which Edith had the baby so hard or which Dan was so frightfully bothered with itching, burning, and protruding.





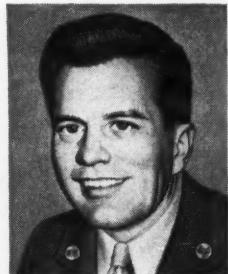
# Medal of Honor



Sergeant Travis Watkins,  
Gladewater, Tex.—Medal of Honor



Lieutenant Frederick Henry,  
Clinton, Okla.—Medal of Honor



Sergeant Charles Turner,  
Boston, Mass.—Medal of Honor

This is the season when you think of stars. The one over Bethlehem. The ones on Christmas trees.

But this year remember another star, too—the one on the Medal of Honor. And make a place in your heart for the brave, good men who've won it. Men who, oftener than not, made the final, greatest sacrifice—so that the stars on your Christmas tree, and the stars in your country's flag, might forever shine undimmed.

Right now—today—is the time to do something important for these men who died for you. You can, by helping to defend the country they defended so far "above and beyond the call of duty."

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other pathologic condition—e.g., a neoplasm or a peptic ulcer. I well remember a young fellow coming to me in the autumn of 1914: he had been rejected for the Army because he was edentulous. This was before the Army supplied dentures. He had had his teeth removed some two years before. He told me he could eat the toughest meat with the aid of his jaws, which had got quite hard. The only thing that bothered him was a raw apple, because it slipped.

"In the course of referee work I have come across numerous edentu-

lous working men who had discarded their dentures as they find no assistance from them in digesting their food. This has happened even in cases of peptic ulcer. Improvement in health is often illogically ascribed to dentures, when it is really due to the removal of septic teeth."

I have no wish to disturb the sleep of any of my colleagues who are so deeply and seriously involved in debate on such subjects as anatomic and nonanatomic teeth, hinge axes, and Bennett movements, and the interminable discussions on articula-

tors. I am just pondering on dentures and health.

## Thought on Retirement

A former school principal was honored on his one-hundredth birthday. He didn't give out the usual advice on hard work, thrift, temperance. He did recall his first year in retirement: "My first year on the farm I dumped into an incinerator bushels of papers and documents accumulated through the years. As I watched them go up in smoke, I consigned to the same flames numerous grievances and silly grudges and a few hard thoughts which had also accumulated. Quite a stench rose to Heaven—but possibly it was as welcome as incense."

The most mellow people I have ever known had an undeveloped capacity to accept or nurture affronts. They were too busy doing things to develop suspicions of other people. They did a lot of good because they never pandered for priority and didn't much care who got the credit. They had self-respect but not self-importance. They were not puffed up.

Like everyone else at the half century marker I have accumulated my share of papers and documents. Occasionally I look at some of them. My reactions are mixed. Some of them recall happy moments, dear friends, and events that seemed important. Others are contentious and full of strife. Some I have saved for no reason whatsoever. If I had the courage of the hundred-year-old school principal I would destroy all the papers except those that would give me pleasant thoughts. These I would keep to live with and to help me develop a selective memory. One is never too young to begin laying in such a store for future use. That is a kind of retirement income that we seldom mention.

—E. J. R.

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